Annual Index

Arbitration Pointers

DECEMBER 1955

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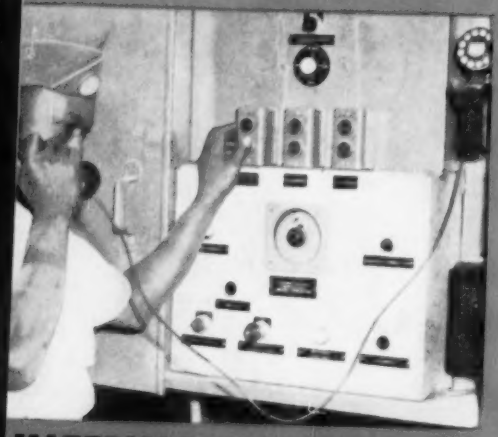
FOOD ENGINEERING

A McGRAW-HILL PUBLICATION



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QUALITY CONTROL • ENGINEERING • MAINTENANCE
INSTRUMENTS • INGREDIENTS

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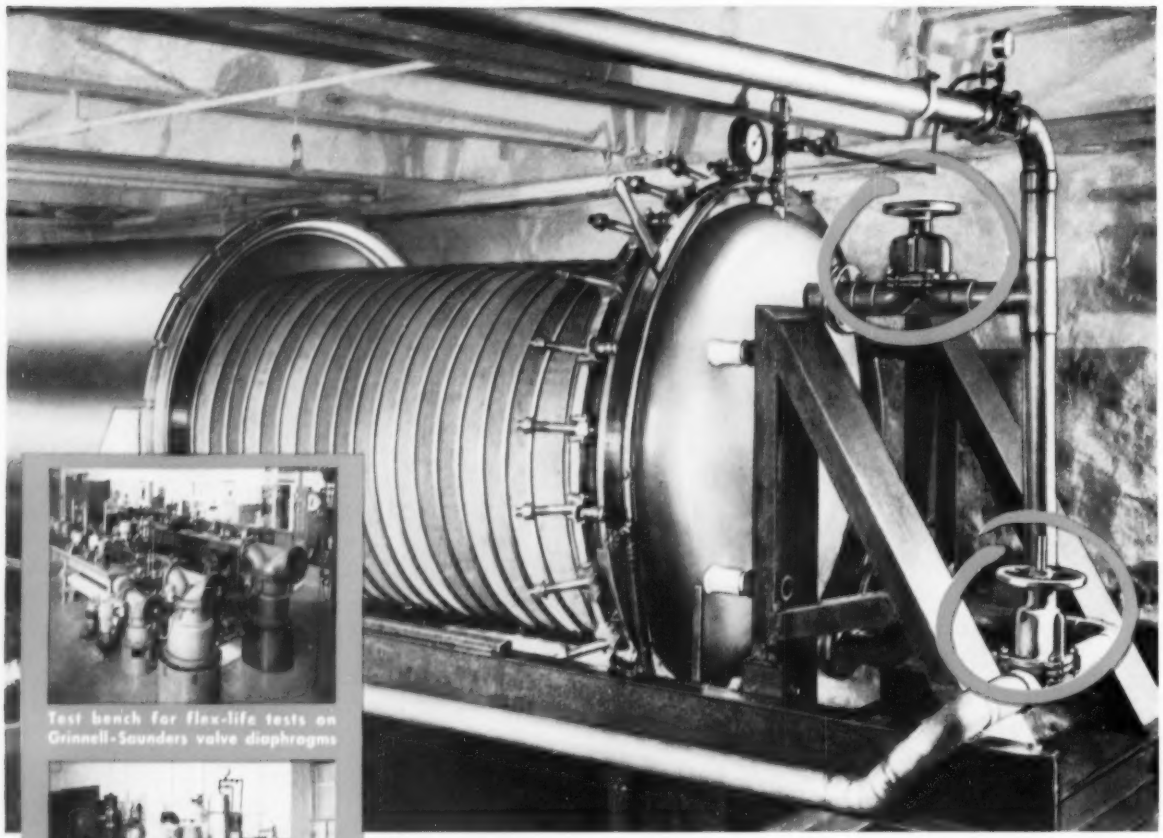
INQUIRY COUPON INSIDE BACK COVER



Grinnell-Saunders Diaphragm Valves on a Sparkler beer filter at Atlas Brewing Company, Chicago, Ill. Working closely with the brewing industry, Grinnell has improved the White Diaphragm and developed the Grinnell Full-Bore Diaphragm Valve, suitable for ball-brush cleaning.

Test bench for flex-life tests on Grinnell-Saunders valve diaphragms

Experimental mold presses for making diaphragms. Man in foreground is checking temperature of mold

Testing apparatus for checking durability of diaphragms under very hot or cold conditions

IS THIS THE RIGHT VALVE FOR YOUR SERVICE?

Chances are Grinnell-Saunders Diaphragm Valves can handle your service, effectively and economically. Thousands of installations, or our continuous testing program, have probably already demonstrated this fact. When necessary, the Grinnell Research Division will run tests using your materials and simulating your operating conditions.

In the Grinnell laboratory, it is possible to reproduce almost any service, hot or cold, under pressure or vacuum—and to operate a valve continuously under these conditions. Based on such exhaustive tests, Grinnell will recommend the proper valve and diaphragm for your service.

Grinnell - Saunders Diaphragm Valves are available in a variety of bonnet and body styles, body materials, linings, and diaphragms. Day after day, they are proving themselves ideal in handling corrosive liquids, gases, beverages, foods, pharmaceuticals, compressed air, semi-liquids—on lines where leakage, corrosion, clogging, abrasion or contamination would be costly.

Bring your next valve problem to Grinnell. There is no obligation. Phone or write Grinnell Company, Inc., 295 West Exchange St., Providence, R. I.

GRINNELL-SAUNDERS DIAPHRAGM VALVES

DECEMBER 1955

Volume 27 Number 12

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FOOD ENGINEERING

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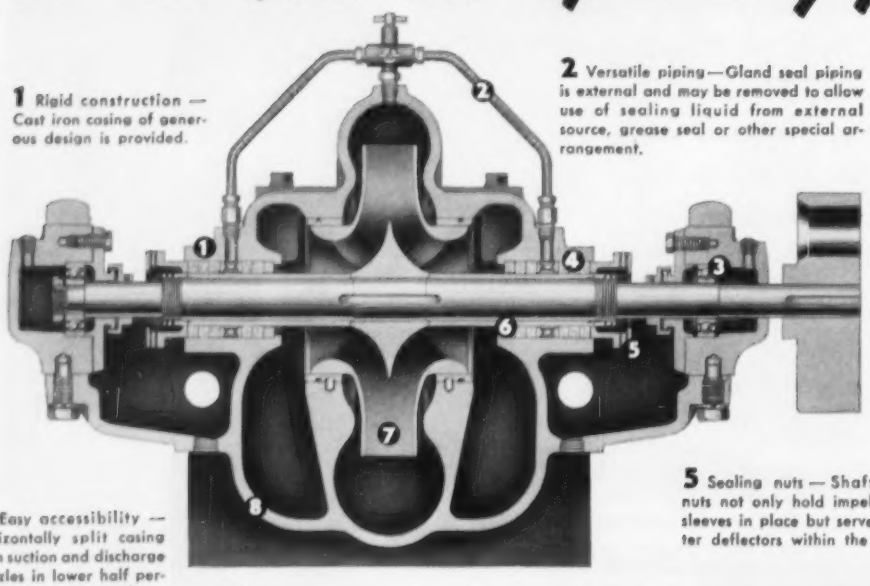
NEW ALLIS-CHALMERS double-suction PUMP

8 Quality Features

... and it's specially priced



1 Rigid construction — Cast iron casing of generous design is provided.

2 Versatile piping—Gland seal piping is external and may be removed to allow use of sealing liquid from external source, grease seal or other special arrangement.

3 Ball bearings—Grease lubricated, single-row bearings are held in proper alignment in a heavy one-piece housing.

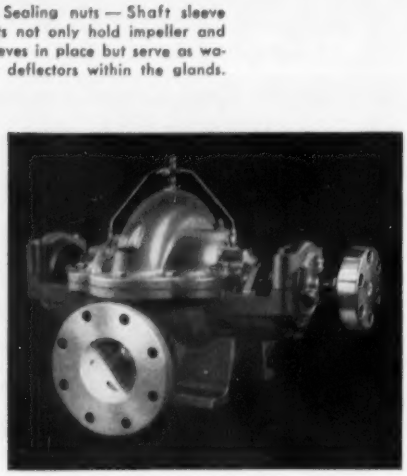
4 Generous stuffing boxes — Boxes are deep to carry ample backing, yet are easily accessible for maintenance.

5 Sealing nuts — Shaft sleeve nuts not only hold impeller and sleeves in place but serve as water deflectors within the glands.

6 Long wearing sleeves — Standard shaft sleeves are of accurately machined bronze. Sleeves extend through stuffing box, right up to impeller hub.

7 Vibrationless operation — Bronze impeller is carefully balanced, double-suction type.

8 Easy accessibility — Horizontally split casing with suction and discharge nozzles in lower half permits inspection without disturbing piping.



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This pump has all the quality features needed for many applications . . . and at the *right price!* It combines the precision machining, skillful assembly and rigid construction that assure proper alignment and long parts life.

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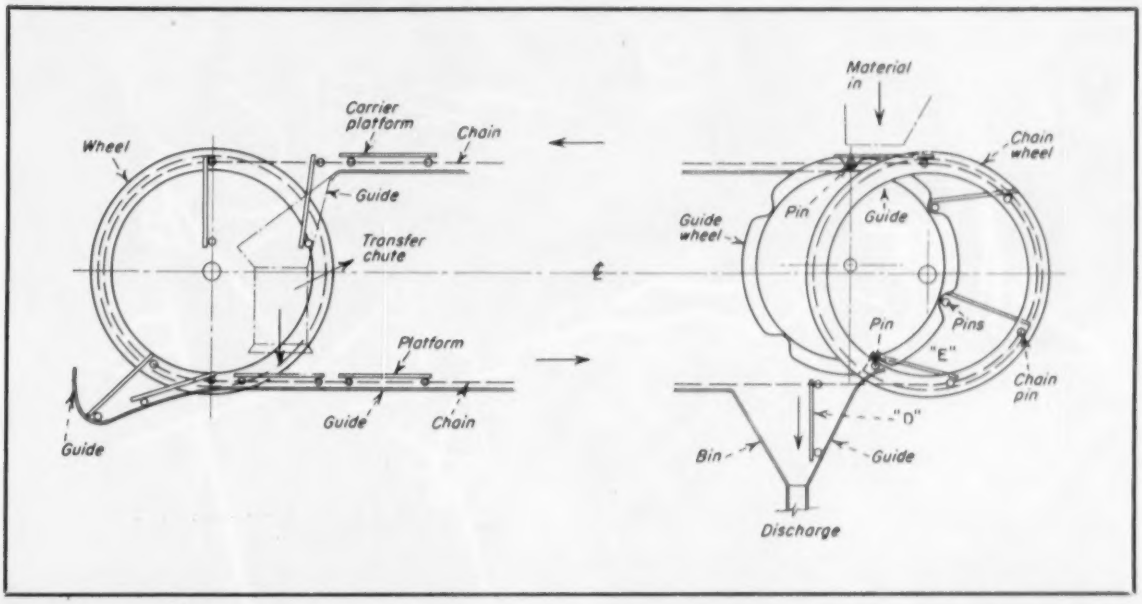
PRACTICAL IDEAS



Doubles Cooler-Dryer Volume

Most conveyor-type coolers and driers are so designed that they are effective throughout only one travel of a conveyor belt (usually the top travel), and not during the return travel.

Here's an arrangement (see sketch) whereby drying or cooling can take place throughout the conveyor's full travel. Thus, the same volume of product can be obtained in one-half the floor space or approximately twice as much in the same space.—*Dr. Robert Lobstein, Consultant, Santa Monica, Calif.*

Stainless Face and Bushing Save $2,500

On carbonated beverage fillers in our bottling plant German silver valve arms are used to permit flow of counter-pressure gas in and out of bottles, and to allow carbonated water to flow into the bottles.

But this alloy is subject to corrosion from the CO_2 gas and, after a few months operation, we were faced with a serious water leakage problem. The arms had to be removed and sent to a machine shop for refacing. This became a regular operation.

Back in '47 my boss, David Rascoff, remarked to his friend Joe Florentine, operator of a machine shop, "Joe, why don't you put a stainless plate on the face of these valve arms?"

It sounded like a good idea, so Mr. Florentine tried it. But it wasn't an easy thing to do. He discovered that stainless steel is not easily welded, brazed, or soldered to other dissimilar metals.

Nearly 2 yr. later, however, he brought us a valve arm with a ¾-in. stainless facing. Feeling sure that this was the solution to our problem we had him reface all the arms on our filler.

But several months later the old leakage problem re-

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turned. This time, however, the leak had developed between the valve arm and the stem. So back to Mr. Florentine went one of the arms. After several months he brought it back, having installed a stainless bushing inside the stem hole.

That was early in '49 and, to this day, those arms have operated with no leakage. We have filled over 20,000,000 bottles of various sizes and the arms still show little sign of wear.

It is difficult to estimate the savings we have experienced. But we feel they have exceeded $1,250 per machine per year.—*J. L. Hauser, General Manager, Hammer Beverages, Brooklyn.*

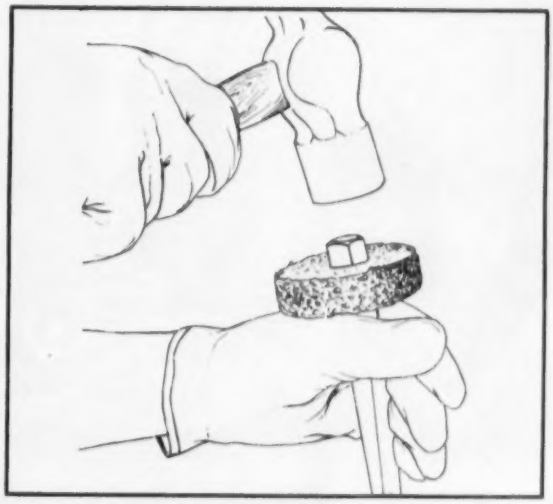
Compressor Serves as Pre-Heater

The poultry scalder in our plant requires hot water which must be heated to required temperature by fuel oil. At the same time cooling water enters the jackets of our Freon refrigeration compressors at 60-65 deg. F, and is discharged pure, 95 deg. F. water at the rate of 20 gpm.

What is more logical than to pipe the discharged cooling water through copper tubing to installed water heating and storage tank, saving approximately 40% of the Btu.'s required for scald water heating?

During the night the 2500 gal. hot water storage tank is filled by jacket water. During the day jacket water is added in sufficient amount so no city water need be added for scalding operation.

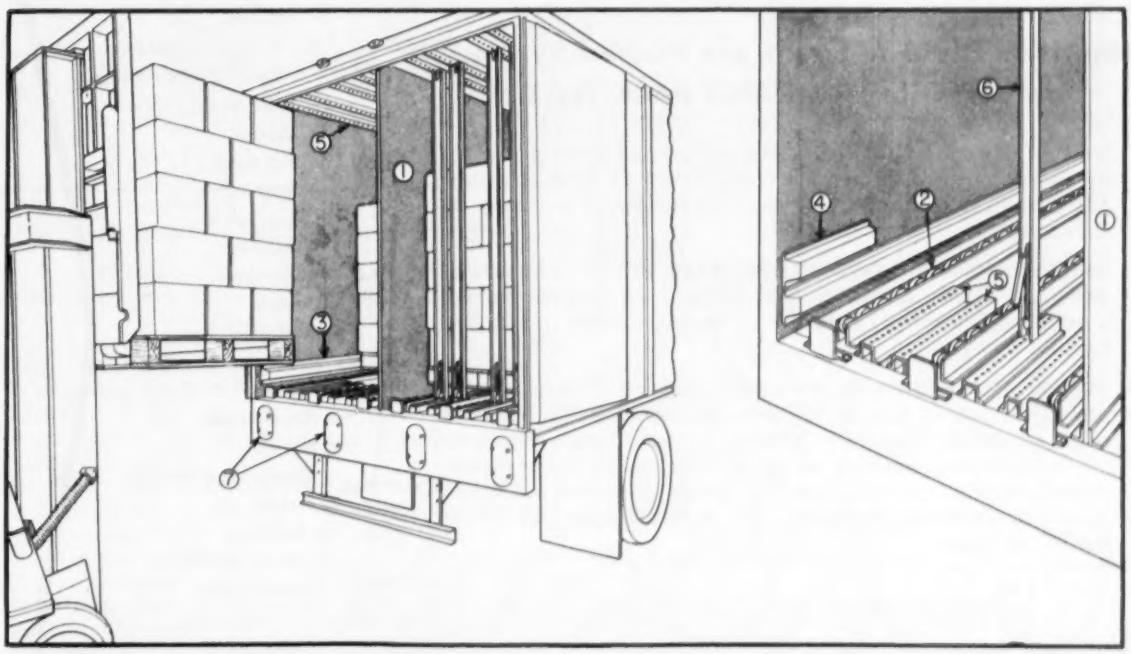
In this way a few feet of copper pipe have saved thousands of gallons of water and an appreciable volume of fuel oil.—*Edwin D. Mann, plant foreman, Queens City Poultry Co., Allentown, Pa.*



Hand Protector Made From Sponge

To protect the hands when using star drills, chisels, caulking irons, etc., an ordinary household cellulose sponge is cut in its center and slipped over the end of the tool. The hole should be small enough to satisfactorily grip the tool over which it is drawn.

The protective sponge (see sketch) is light in weight and does not affect the dexterity necessary for use of the tool. Nevertheless, it guards against hand injury if hammer glances off the tool.—*National Safety Council (DuPont Corporation contributed).*



Body Designed for Palletized Loads

A new all-aluminum trailer has been designed by Schaefer Brewing Co. engineers to handle palletized loads of kegs and/or packaged beer. The same design has been used for single-axle bodies and 33-ft. tandem trailers.

A metal partition—illustrated (1)—running length of the body serves to form two lengthwise sections each containing a single line of palletized containers. These are confined in a tunnel-like compartment that prevents side motion.

The length-wise partition is located four inches to the right of trailer body center line to take, on the right, smaller size 36 in. x 44 in. pallets, and, on the left, those of larger dimension.

Ten pallets are placed on the left and eight on the right

Operation Hand Pack

Cuts Labor Costs Two-Thirds!

FMC Hand Pack Filler on spaghetti in large West Coast food plant.

America's Favorite Foods are Packed by the Ton on Versatile FMC HAND PACK FILLERS

HERE'S THE KEY TO CUTTING COSTS and speeding up filling of whole or cut food products. The versatile FMC Hand Pack Filler accurately fills virtually all products that can be filled by hand, in practically all sizes and shapes of cans and jars!

SAVES MANPOWER, MONEY, FLOOR SPACE. This amazing machine, filling a product that requires four operators, for example, has the same capacity that would require at least twelve operators on a straight line belt arrangement!

SEVERAL ATTACHMENTS ARE AVAILABLE to provide a filler for virtually any requirement of semi or fully automatic operation. These include single and double automatic filling hoppers, rotary brushers and wipers for overfilled cans, telescopic measuring top, single and double packer-briners, vibrating can track, automatic juicing attachment, and special feeds and accessories for handling jars. Complete details and specifications on request.

MOST *FLEXIBLE* FILLER OF ALL HANDLES WIDE VARIETY OF PRODUCTS

- Spaghetti
- Cut String Beans
- Beef Stew
- Tomatoes
- Peas
- Cut Asparagus
- Whole Grain Corn
- Beets
- Cherries
- Macaroni
- Coconut
- Lima Beans
- Mixed Vegetables
- Diced or Sliced Vegetables
- Olives
- Small New Potatoes
- French Sliced Potatoes
- Shoe String Potatoes
- Onions
- Nut Meats
- Chop Suey
- Bean Sprouts
- Pimientos
- Mushrooms
- Oysters
- Meat Balls
- Maraschino Cherries
- Ravioli
- Sliced Apples
- Pie Mix
- Chicken and Noodles
- Kraut
- Berries
- Pickles and Relish
- Fish Flakes

If your product is listed here, chances are you can fill it faster for less using an FMC Hand Pack Filler. If it isn't listed and you would like information on its adaptability to this type of filling, drop us a card, or call your nearest FMC representative.

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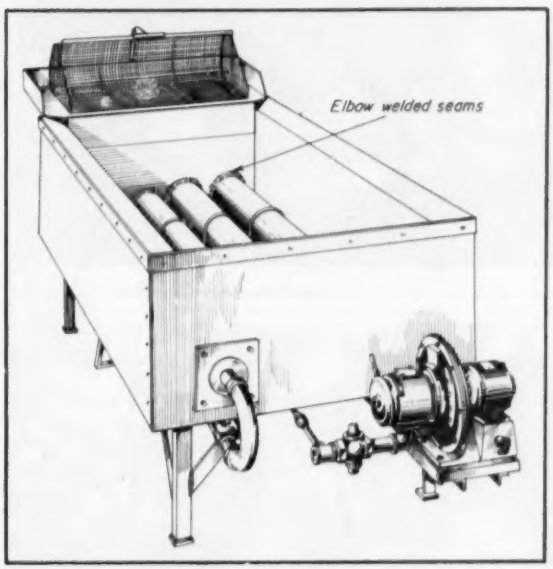
in 33 ft. bodies, while nine and seven pallets respectively can be loaded into the 28 ft. body.

Both compartments are equipped with three rows of 3-in.-dia. roller-wheel (2) located along the trailer floor. These allow pallets to slide freely. Rub-rails (3) are located along bottom of walls to prevent damage to the truck body. Two stops (4), attached to truck rear at either side are to hold pallets as they are pulled to back end of trailer for unloading.

Each compartment has four channels (5), located at top and bottom of the trailer. Into multiple holes, closely spaced in the channels, fit anchoring ends of locking bars (6). These prevent pallets sliding during transit.

Two doorways are located in front end of body to enable load inspection.

Damage to truck rear is prevented by four large rubber bumpers (7).—*FE staff.*



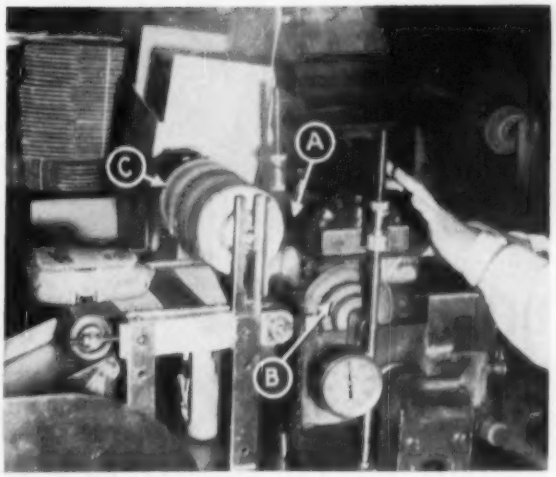
No Shut Down—Thank Iron Cement

Recently our potato chip fryer confronted us with a problem which was solved by this simple and inexpensive means.

One of the fryer's heating tubes (see sketch) which passes through the vat of the fryer sprung a small leak. As a result, the liquid cooking fat dripped through the leak into the tube where the hot gas flame from the oil burner partly burned and partly vaporized the oil to create a smoke nuisance.

When means of repairing the leak was investigated, it was learned that welding the seam would necessitate complete removal of tubes and also the bottom of the vat. This involved expense and delay which would tie up our production during a peak season. At this time it was suggested that we try to temporarily plug the leak with iron cement.

'Smooth-On' No. 1 cement, a fine powder mixed with water to form a stiff putty, was applied after the small crack was carefully scraped and cleaned. The iron cement putty was worked into the orifice and allowed to dry over night. The following morning the vat was filled with cooking oil and burner heated to the cooking temperature. We were thus able to continue daily operations without costly interruption throughout our busiest season.—*Victor H. Holec, Crispy Food Co., Cedar Rapids, Iowa.*



Makes Package Shrinker

This compact, portable package-shrinker insures tight fit of frankfurter overwraps, eliminating slime and mold formation. Operator places label on rough side of a previously-wrapped package and pushes it into machine. Sealer —(A) in photo—fastens the label, while at the same time package is forced into contact with a sponge rubber roller (B)—formed in the shape of a shallow 'U'. This roller dips continuously into a reservoir of 200-deg. water, which it applies to the package to shrink sides and bottom to a snug fit. Water is kept at proper temperature by a thermostatically-controlled hot plate.

Package ejects from the shrinker under a compression roll (C) that presses label tight. A wire-mesh belt conveys the finished package to a chute. Entire unit is homemade. —*FE Staff*

Tray Drier Truck Improvement

A removable handle for maneuvering a truck loaded with drier trays has two assets—minimum space requirement and added safety.

Two metal loops (see sketch) are attached to the tray holder to provide slots through which the extended prongs of the handle can be inserted. These handles adequately control the movement of the truck.—*National Safety Council, Chicago (American Cyanamid Company contributed).*

SALES SHOW it pays to package in film made of BAKELITE Polyethylene

"ground beef sales have gone UP 33%!"

Piedmont's Best packages supplied by **Package Products Co.,** Charlotte, N. C.

Small wonder I. N. Johnson, manager of Yadkin Valley Packers, Incorporated, Elkin, N. C., is solidly sold on packaging in film made of BAKELITE Brand Polyethylene. But, sales increases (as much as 300% with chickens) are only one part of the story.

"Bags for ground beef cost less than 25% of what we used to pay for tubs. And besides being cheaper to buy, they're cheaper to fill." Furthermore, for turkeys in the freezer, polyethylene "doesn't get brittle no matter how cold it gets."

It solves a "handling" problem too. "Packaging liver used to be messy . . . drippage no matter how we wrapped it. Now, we put liver in polyethylene bags, and that's that."

SPECIFY FILM MADE OF

Summary: "Our sales are increasing. So are the number of items we supply, and polyethylene packaging is tied right into our expansion plans."

Surely, here is experience that suggests that *you* talk to your packaging supplier about the visual appeal, brand identification, toughness and product protection of film made of BAKELITE Polyethylene.

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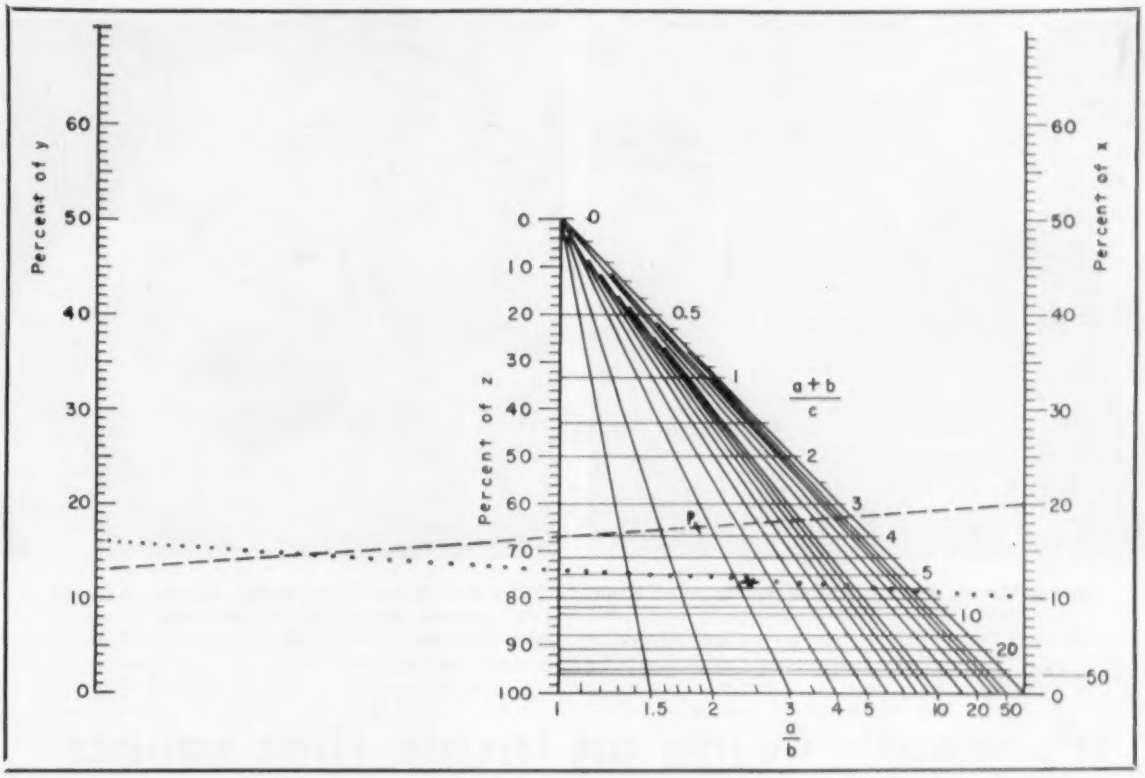


Solution Blending Nomograph

The blending of three materials containing some common component (e.g. sugar) to produce a mixture having desired composition of the common component is met frequently in the food processing plant and laboratory. The accompanying nomograph, permits unique solutions to this and similar problems of batch or blend make-up.

Suppose, for example, one must blend three solutions having sugar contents of 12°, 7°, and 18° Brix so as to yield a blend of 15° Brix. It will be noted that the desired blend *lies between the two highest values* of the given solutions. To use the nomograph we begin by arranging the solutions in three columns (i.e., x, y, and z) in ascending order of °Brix and under each place the value of the blend desired. Then subtract the smaller from the larger value in each column. Thus, we have

x	y	z
7	12	18
15	15	15
—	—	—
8	3	3

If we divide the result of column 1 by the result in column 2, we obtain a/b = 8/3 = 2.66. The value a + b/c is obtained by adding the result in column 1 to the result in column 2 and dividing by the result in column 3. For example, a + b/c = 8 + 3/3 = 11/3 = 3.66. We then have the two entries necessary for using the nomograph to solve our problem.

Enter the a/b scale at the value 2.66 and determine its intersection with the value 3.66 as read on the a + b/c scale. This intersection defines the Pivot Point (P). A straight edge passing through P and intersecting scales x, y, and z gives the respective composition of a blend of 15°Brix. The setting in the nomograph (dashed line) shows that a blend of 15°Brix may be obtained by mixing 7°, 12°, and 18°Brix solutions in the proportion of 20, 13, and 67 per cent by weight, respectively. By pivoting about the point P, the values in per cent composition of the three solutions may be obtained for a range of possible blends, all giving 15°Brix.

Now for a second example:

Three solutions, each having salt contents of 10, 17 and 5 per cent, respectively, are to be blended so as to yield a product of 7 per cent salt.

(*Continued on next page*)

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to some one like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

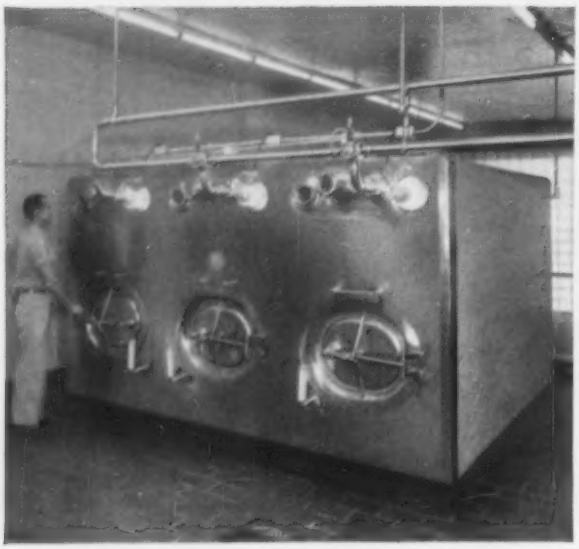
Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

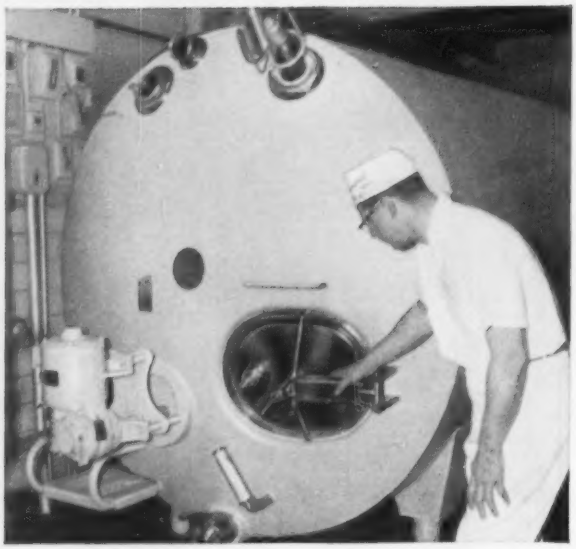
We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors.

OCTOBER PRACTICAL IDEA WINNER was "Carton Traffic Cop," sent in by W. E. Freeman, V.-P. of Production, H. W. Lay & Co., Inc., Atlanta, Ga.



Cherry-Burrell 3-compartment Rectangular Tanks ... insulated for holding, heating, cooling. Standard capacities individual tanks to 5,000 gal. Special sizes upon request.



Cherry-Burrell Horizontal Tanks. Insulated for holding or with channel wall surface for pre-heating, pre-cooling. Standard capacities to 10,000 gal. Larger sizes available.

It's what's going on inside that counts

And what goes on inside Cherry-Burrell Stainless Steel Tanks varies as much as the size and shape of the tanks shown here.

For example, you can use them as process vessels for handling a wide variety of liquids and semi-liquids ... to provide "surge" for heating and cooling in continuous systems ... for blending and pre-heating ... formulating and holding ... for mixing, heating and cooling.

No matter what size or shape tank you need ... or *what service you want it for* ... you can get it from Cherry-Burrell. And you can get more specific information from your Cherry-Burrell Representative. Why not lay your tank problems in *his* lap?

CHERRY-BURRELL
CORPORATION

427 W. Randolph Street, Chicago 6, Ill.

Dairy • Food • Farm • Beverage • Brewing • Chemical • Equipment and Supplies

SALES AND SERVICE IN 58 CITIES — U.S. AND CANADA

Cherry-Burrell Single-Shell tanks for holding, mixing, blending of one or more products. With or without agitation. Capacities to 3,500 gal. Larger sizes available.

Cherry-Burrell Vertical Tanks for pre-heating, pre-cooling, holding product temperatures. Standard capacities to 3,000 gal. Larger sizes available.

Cherry-Burrell Open Top Single Shell Tanks for "surge" storage, batch mixing operations; side or bottom mixing. Standard capacities from 60 to 500 gal. Larger sizes available.

In this case the desired product *lies between the two lowest values* of the given solutions. This being the case, we arrange the solutions in three columns in *descending* order of per cent concentration and under each place the value of the blend or product desired. Then, as before, subtract the smaller from the larger value in each column.

Therefore, we have:

x	y	z
17	10	5
7	7	7
10	3	2

Divide the result in column 1 by the result in column 2 and obtain a/b = 10/3 = 3.33. As before, we add the result in column 1 to that in column 2 and divide by the result in column 3. Thus, a + b/c = 10 +3/2 = 13/2 = 6.5.

Enter the a/b scale at the value 3.33 and determine its intersection with the value 6.5 as read on the a + b/c scale. This intersection defines the Pivot Point. A straight edge, passing through the Pivot Point, intersects the x, y, and z scales at those values which yield a product of 7% salt. In the setting shown (dotted line) it is seen that the 17, 10, and 5 per cent salt solutions blended in the proportions of 10, 16, and 74 per cent, by weight, respectively, yield a product of 7 per cent salt. In addition, by pivoting about the Pivot Point the compositions of all possible blends, all yielding 7 per cent salt, can be found.—*Joseph T. Hogan, Chemical Engineer, Arabi, La.*

A Batch of Shop Kinks

From GFC come four diversified tips relative to lubrication of bearings, taps applications, use of compression fittings in place of welded pipe, and selection of rope for elevator service:

Lubrication of bearings that are simultaneously exposed to both high temperatures and high vacuums has now been successful with use of molybdenum sulfide as the lubing agent.

It has been suspended in a low-viscosity carrier (such as a light turbine oil) that evaporates to leave an effective film of the m.s. on the bearing surfaces.

For varied testing and also permanent applications, Teflon tape with pressure-sealing silicone adhesive merits consideration on the basis of its slippery, non-sticking, heat-resisting properties.

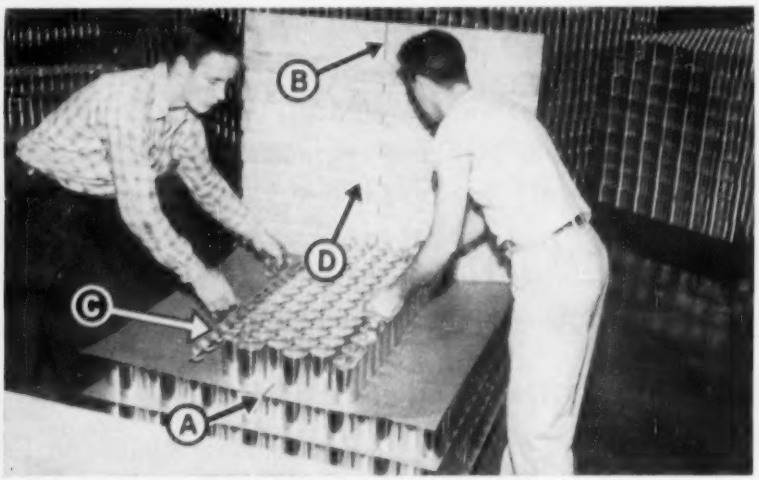
It's now available in 0.006-in. thickness and widths from 1¼ to 12 in.

Compression fittings will, in some instances, make an economical and superior substitute for welded piping, particularly when corrosion-resistant metals are involved.

Valves and fittings are available that have approval of some of the most critical authorities. Upper limit of size is usually in the vicinity of 1¼ in.

For elevator service, 8x19 wire rope is reported as superior to the 6x19.

Four favorable factors are cited: Longer rope life, reduction in groove wear, quieter operation, and better shock resistance.—*Technical Bulletin, General Foods Corp., White Plains, N. Y.*



Bright-Can Palletizing Aids

In our plant we palletize and warehouse processed canned foods before casing. This departure from normal procedure, which considerably cuts handling costs, is made possible by innovations in equipment and procedure.

A framework was constructed (see left photo) of 1 in. angle iron and ¼ in. plywood. This unit serves to align the pallet and also to guide can stacking.

Each layer of cans is separated by 30 point liner paper which aids operators in locating cans and contributing to stability of the stack. Down the center of each divided sheet is a closely marked guide line—(A) in right photo—which is oriented with a guide line (B) on the upright plywood frame.

Employing the Dawson Can Lifter (C) an operator lifts from the can line 13 No. 303 size cans or equivalent and places the row against the guide line on the separator paper. Then he nests the next row in the interstices between the first row. Removal of lifter is facilitated by cleats (D) attached to the upright plywood guide, located to provide ample space for lifter withdrawal.

Pallets which are 45 in. by 45 in. require 20 min. to stack, and accommodate full handler loads of cans. Eleven layers of No. 303's (2,288 cans) is equivalent to 95 cases of 24-303's.

Paper separators which last 3-5 yrs. cost 96 cents per pallet. Cases for same load: $11.40. Loaded pallets, which are stacked 3 high in the warehouses, contain the equivalent per stack of 286 cases.

Here are estimated savings of present method compared to former: Labor, 20%, warehouse space 28% and warehouse cases 85%.—*O. J. Shakelton, Warehouse Supt. Washington Canners, Vancouver-Yakima, Wash.*

NIAGARA

THE ORIGINAL METHOD OF AUTOMATIC *Completely* FROST FREE PRE-COOLING, CHILLING, FREEZING, HOLDING AND REFRIGERATED STORAGE

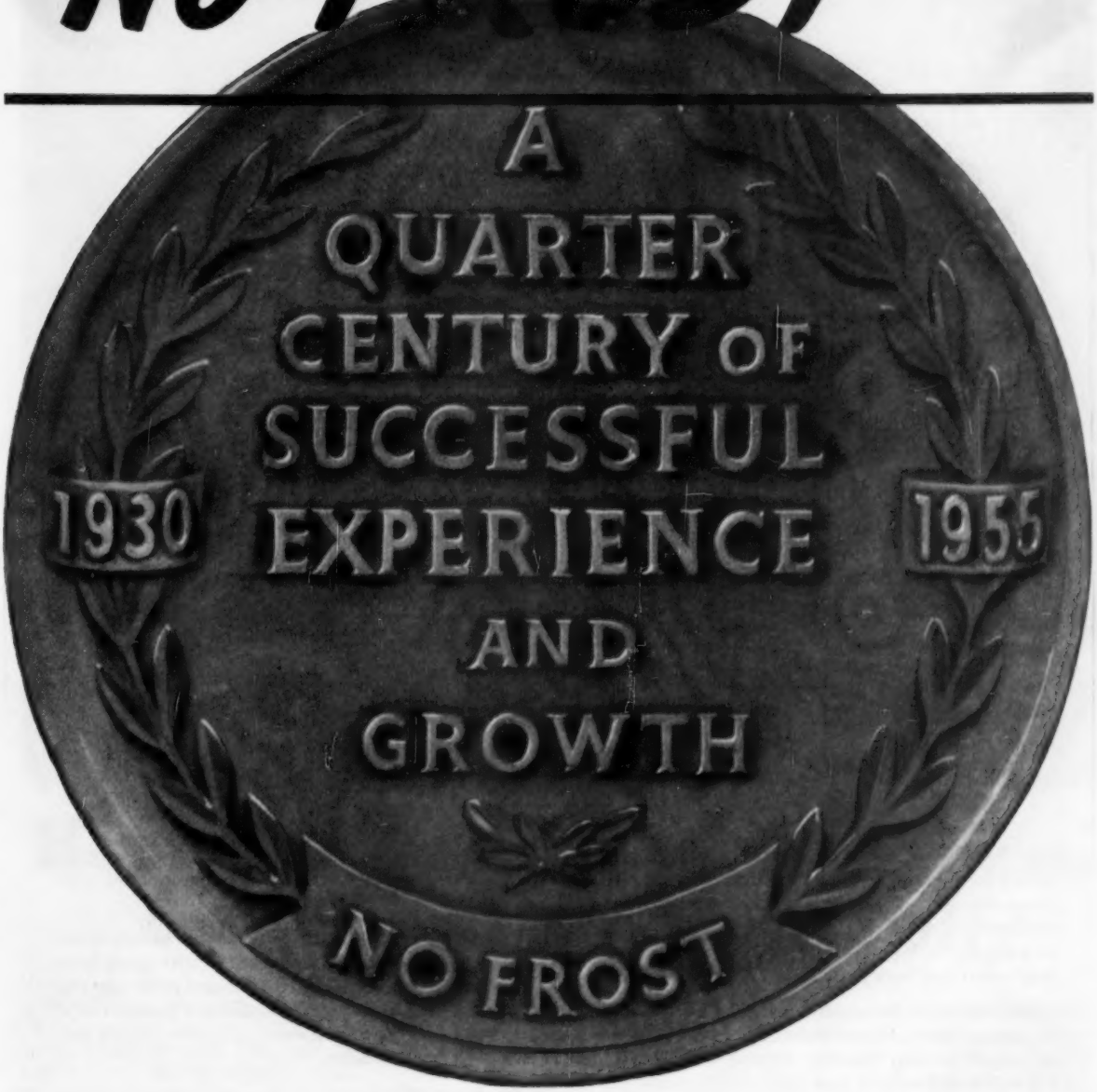
Niagara and only Niagara originated the idea of completely frost-and-ice-free refrigeration. Niagara designed and built the first equipment using wet coils to improve heat transfer. Niagara developed the method of using an organic frost preventive. Niagara pioneered the application of frost free and moving air methods of refrigeration in the food industries.

HIGHLIGHTS OF NIAGARA NO-FROST PROGRESS ARE:

Niagara Air Conditioning Units and Fan Coolers
Niagara Spray Coolers Niagara Brine Spray Coolers
Niagara No-Frost-Liquid Spray Coolers
Niagara Spray Deck Coolers
Niagara Type A No-Frost-Liquid Concentrators
Niagara High Capacity Jet Concentrators

NIAGARA BLOWER COMPANY

"NO-FROST"



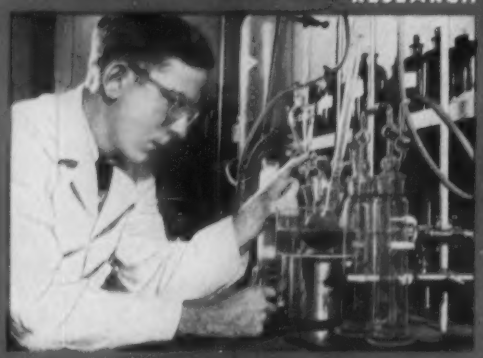
Niagara developments are protected by U. S. and foreign patents and under exclusive license of the Research Corporation.

Executive Offices: 405 LEXINGTON AVE., NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

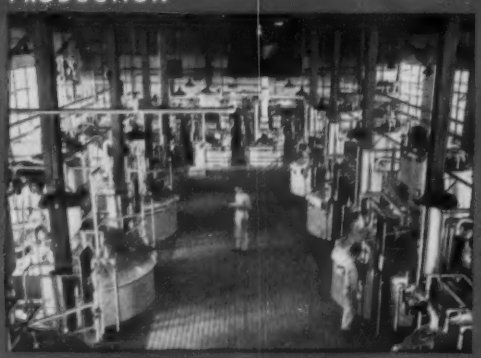
SALES

TECHNICAL SERVICE

RESEARCH



PRODUCTION



Use these specialists to create

NEW PROFIT OPPORTUNITIES

Today's consumers are nutrition-minded and open-eyed, yet cost conscious. To survive under these circumstances, a food product needs to offer something *extra*. If you are developing a new product, or must cut production costs on a staple, it will pay you to call in the Merck team. Here's what they have to offer:

SALES—Individual Merck representatives are specialists in cereal chemistry, vitamin technology, baking technology, meat packing, freezing, canning, and bottling. Through well-developed team play, your problem gets to the right man fast.

TECHNICAL SERVICE—The Merck technical service staff knows the food industry from albumin to zwieback. In addition, it can bring the Company's entire technical and scientific resources to bear on problems relating to the developing, manufacturing, analyzing, or labeling of food products.

RESEARCH—The Merck staff of research chemists is one of the country's largest. From this creative group have come major discoveries in vitamins and other scientific developments—with many practical and potential food applications. Merck customers, of course, are the first to enjoy these advances.

PRODUCTION—Merck is the world's foremost producer of vitamins and a major source of fine chemicals for the food industry. Through the years customers have come to rely on the purity, uniformity, and dependability of every Merck product they buy.

Research and Production
for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

© Merck & Co., Inc.

B. F. Goodrich announces

Koroseal belt washes like glass, cuts cleaning time in half

STICKY icings, jelly, most stains wipe right off that belt with just a damp cloth. That's because it's made of Koroseal, the flexible material developed by B. F. Goodrich.

The Koroseal belt has a smooth, polished surface that even oil can't penetrate. Food particles can't grind in. So there's no need to scour it. A few seconds with a damp cloth and the Koroseal belt is clean and looks as new as the day it was put on. No wonder users say it cuts cleaning time in half. And since Koroseal is completely, permanently waterproof, the belt cover never gets damp or soggy, and so can be used right after washing.

Koroseal resists cracking and peeling, doesn't get sticky. And there's no danger of contamination with Koroseal because it is nontoxic, and has no odor or taste to transfer to foods. With its high resistance to cooking oil, animal fats, and most acids, the Koroseal belt is ideal for bakeries as well as places where meats, nuts, greasy pans are handled.

Two other belts, developed by B. F. Goodrich for food handling, are called Highseal and Kleenseal and are made of new types of rubber compounds. Their "sight-saving" green color reduces glare and eyestrain on packaging and inspection lines.

It will pay you to find out more about these work-saving, money-saving improvements in food handling. First step is to have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll send his name. *The B. F. Goodrich Company, Dept. M-514, Akron 18, Ohio.*

Koroseal—T. M. Reg. U. S. Pat. Off.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

For more data, circle this page number on card at back →

where it touches food

USE STAINLESS

...for cleaner, more economical processing

Check through this list of advantages and you'll see why Crucible Rezistal® Stainless Steels have gained such wide acceptance in the meat and food processing industries —

- **Do not change the flavor or appearance of food in any way.**
- **Resist the corrosive attack of food acids and other elements.**
- **Withstand harsh cleaning chemicals that might affect other metals.**
- **Clean easily without developing the rough spots that harbor bacteria.**
- **Can't chip . . . they're solid stainless all the way through.**

Crucible Stainless Steels offer another practical advantage — *ease of fabrication.* You can bend them, shape them, weld them, machine them — make any equipment, no matter how complex, out of Crucible stainless. But let us help you decide how to put stainless steel to work for you. For fast action — call Crucible. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

Crucible Stainless Types for Food Processing

STAINLESS REZISTAL TYPE	NOMINAL %* Cr	Ni	Other	USED FOR
302	18	8		General Purpose
303	18	8	S or Se	Free-machining
304	19	9	.08% Max. C	Welding
316	18	12	Mo	High Corrosion-Resistance
304 LC	19	9	.03% Max. C	Used where intricate welding is required
316 LC	18	12	Mo Low C	Used where intricate welding is required
347	18	8	Cb	Welding (stabilized)

*Subject to U. S. Government restrictions.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Modern Truck Features That Mean Business!

Chevrolet trucks have got it! A full list of modern features that mean better business—on the job today and at trade-in time tomorrow!

When you get right down to it, any truck without all of Chevrolet's Task-Force features is still living in the past. Why risk losing money with an old-fashioned truck—both on the job and at trade-in time—when you can get a Task-Force model with the industry's most advanced features?

Most modern power—V8 or 6. There's longer life in Chevrolet V8's (extra cost in most models). With their short-stroke design—shortest of any leading truck—you can count on less friction and wear per mile. If you go for sixes—Chevrolet's gas-saving valve-in-head sixes are famous for their dependability. All engines are sparked by a modern 12-volt electrical system for quicker starting and smoother going!

Most modern comfort and safety features. New efficiency boosting advances like panoramic windshield, High-Level ventilation, softer seat action and concealed Safety Steps!

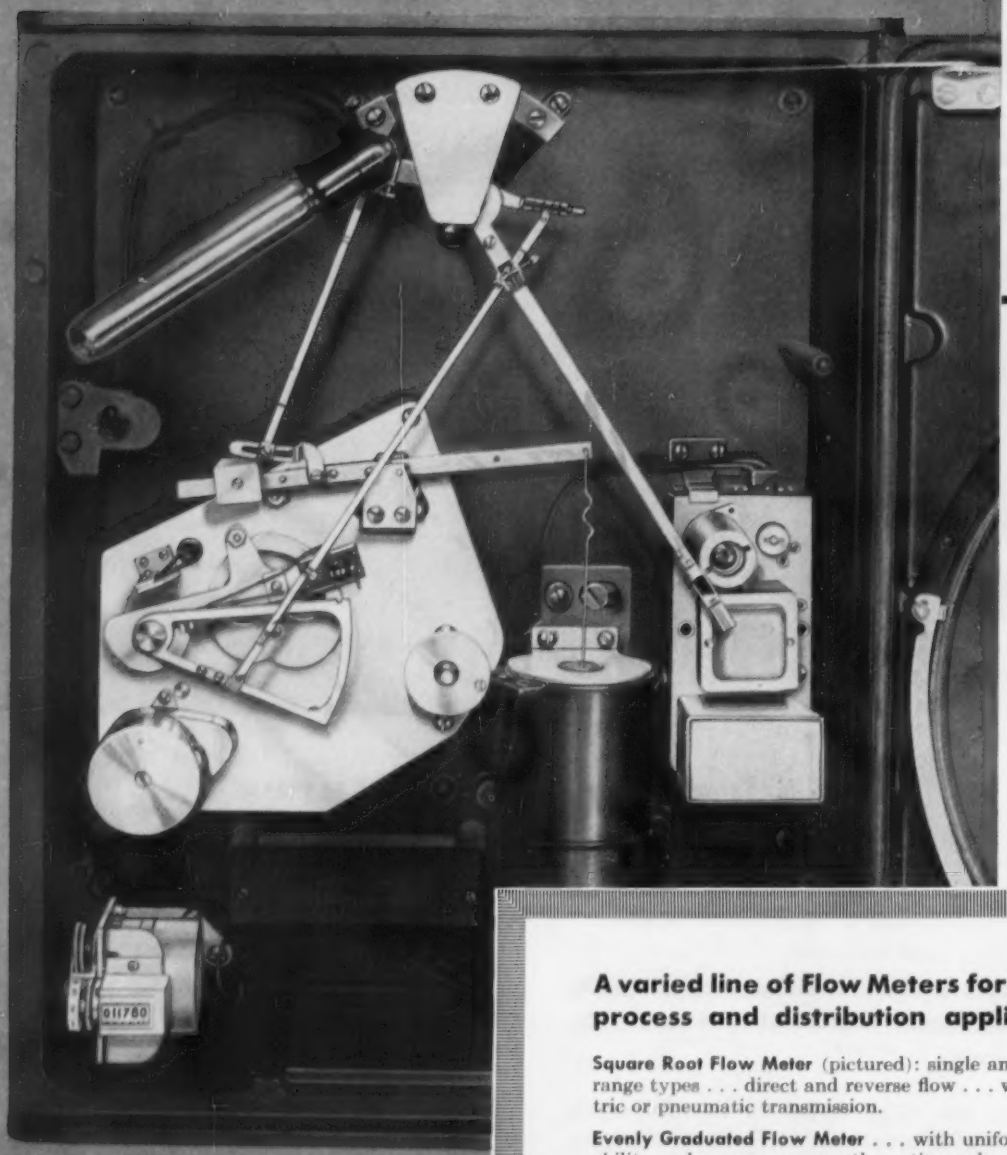
Most modern chassis features. New suspensions; new, more rigid frames; Power Brakes standard on 2-ton models!

See your Chevrolet dealer for details. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

NEW CHEVROLET Task-Force TRUCKS

CHEVROLET

For more data, circle this page number on card at back →



A varied line of Flow Meters for every process and distribution application

Square Root Flow Meter (pictured): single and double range types . . . direct and reverse flow . . . with electric or pneumatic transmission.

Evenly Graduated Flow Meter . . . with uniform readability and accuracy across the entire scale.

***ElectroniK* Flow Meter** . . . indicates, records, controls, integrates, resets control index of another instrument.

Bell Type Flow Meter . . . for low pressure gases.

Ratio Flow Controller . . . regulates secondary flow in proportion to a primary flow.

Process Sequence Controller . . . useful for timing the addition of reagent to a preset cycle.

Parshall Flume Meter . . . for measuring flow in open channels and weirs.

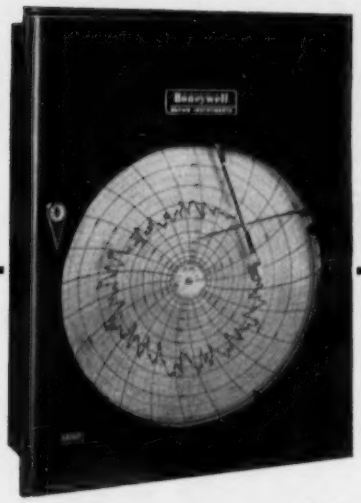
***Tel-O-Set* Miniature Instruments** . . . for graphic panels and other applications where space is at a premium.

Area Flow Meter . . . electric meter body for use with viscous fluids.

Differential Converter . . . the mercuryless flow transmitter with high sensitivity, precision and rangeability.

▲ *Reference Data:*

Write for Catalog 2321, "Flow Meters, Indicating, Recording, Integrating, Controlling."



The Brown Flow Meter line

was designed for your process applications

An important reason why Brown flow meters give you better performance is that they were designed specifically for flow recording, integration and control in industrial processes. Far from being step-children of boiler plant instruments, they embody features that fit the needs of modern production technology. Their design has been refined and perfected throughout 28 years of experience in flow instrumentation . . . to assure you of the utmost in precision, versatility and reliability.

For measurement, Brown Flow Meters give you a complete range of meter bodies to work with any fluid at any pressure . . . either electrical or pneumatic transmission . . . and the flexibility of interchangeable range tubes.

For integration, Brown Flow Meters feature accurate, simple electronic flow integration, in a design that places no mechanical load on the measuring mechanism.

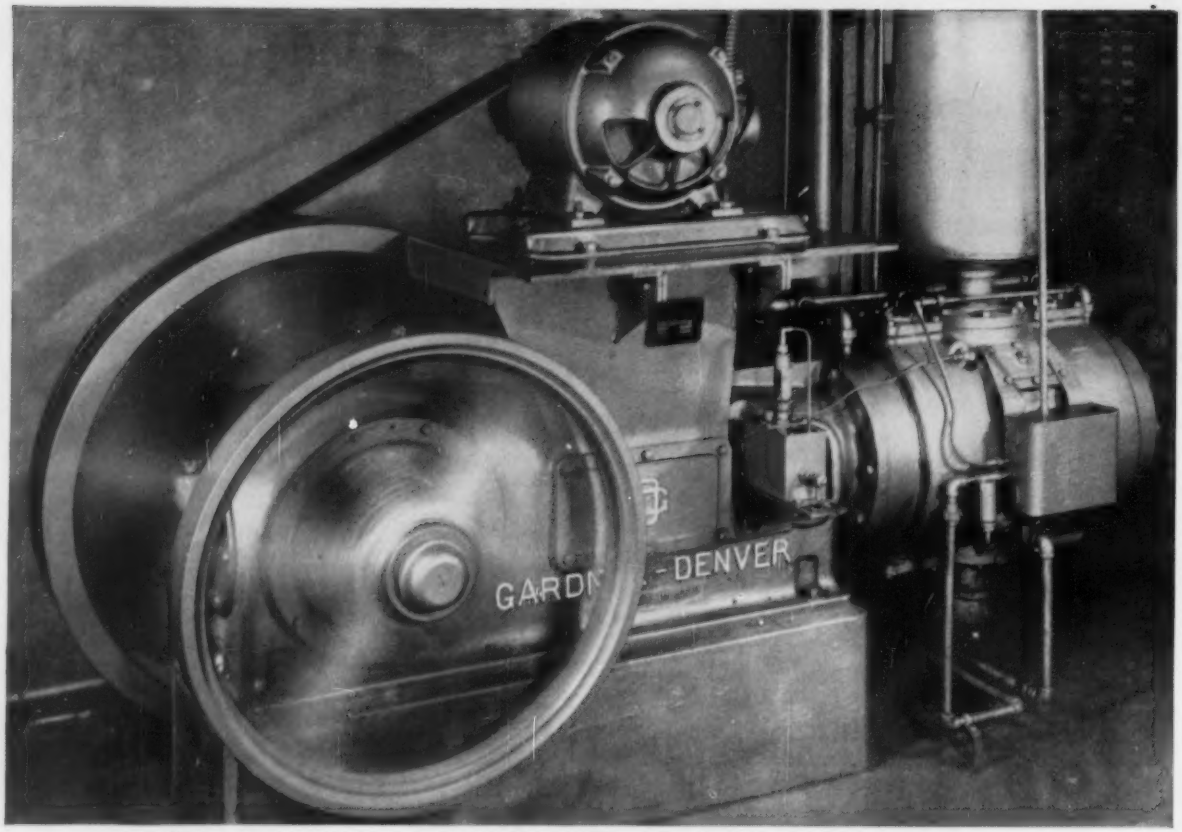
For control, Brown Flow Meters, particularly those with square root calibration, offer an unequalled variety of control actions to match the needs of the simplest to the most complex process requirements.

For service, Brown Flow Meters give you basically simple and rugged designs that cut maintenance to the minimum . . . plus the convenience of prompt assistance in start-ups, routine maintenance and emergencies, by Honeywell specialists located near your plant.

Ask your local Honeywell sales engineer to discuss your flow applications. He's well qualified to give competent consultation . . . and he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

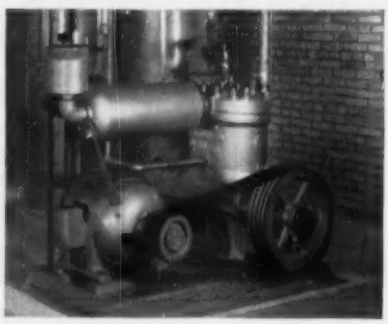
MINNEAPOLIS
Honeywell
BROWN INSTRUMENTS
First in Controls



Model RX — 89 to 1292 c.f.m. Bulletin HAC-40.

MORE GARDNER-DENVER HELP FOR YOU IN THIS AGE OF AIR POWER

Model AA — 32 to 183.6 c.f.m. Bulletin AA-6.

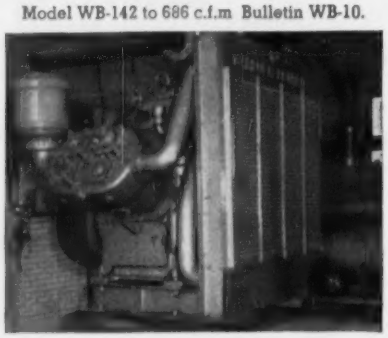


* Expert help in choosing the right size and type air compressor for your plant.
* Pointers on compressor care and maintenance to help you obtain the full efficiency of Gardner-Denver quality.
* Application suggestions for utilizing low-cost air power from Gardner-Denver compressors.

GARDNER-DENVER Since 1859

KELLER TOOLS

Model WB-142 to 686 c.f.m Bulletin WB-10.



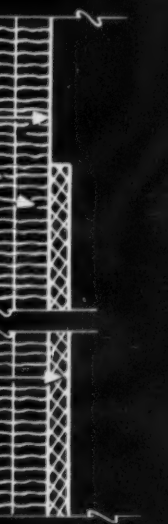
GARDNER-DENVER

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

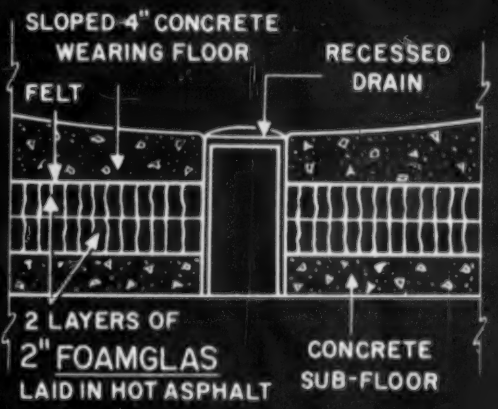
Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Avenue, Toronto 16, Ontario

FOAMGLAS®

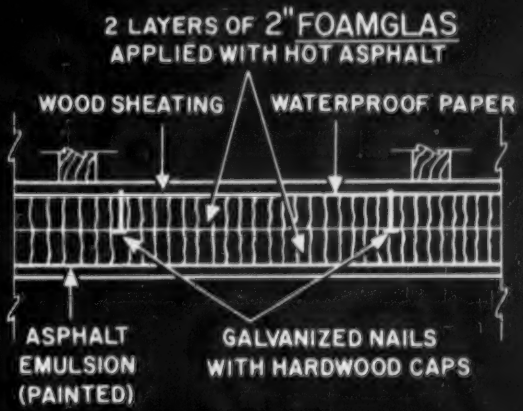
the cellular, stay-dry insulation



DETAIL A
TYPICAL WALL SECTION



DETAIL C
TYPICAL FLOOR SECTION


2 LAYERS OF 2" FOAMGLAS APPLIED WITH HOT ASPHALT
WOOD SHEATING
WATERPROOF PAPER
ASPHALT EMULSION (PAINTED)
GALVANIZED NAILS WITH HARDWOOD CAPS

DETAIL B
TYPICAL CEILING SECTION

"FOAMGLAS insulation proved it stays dry by stopping seepage into our cooler"

reports H. S. Moore, Bohrer & Moore Packing Company, Wapakoneta, Ohio

Use of FOAMGLAS insulation has benefited an Ohio meat packer in several unusual ways. Harry Moore of Bohrer & Moore Packing Company explains it this way:

"We built an addition for a meat cooler and two freezers back in 1950. The back walls of the cooler and one freezer are about four feet below grade. The cooler was completed first. We had a lot of trouble with seepage through the uninsulated wall of the cooler. Later we installed FOAMGLAS on the inside walls of the freezer and we haven't been bothered again with seepage."

Mr. Moore also gives his cellular glass insulation credit for withstanding extremely heavy floor loads, reducing vermin trouble to an absolute minimum and enabling them to maintain economically a constant 38° F. in the cooler and 8° F. in the freezers.

Throughout the meat-packing industry more and more plants are switching to this unique insulation, the only one composed of sealed glass cells which are waterproof, fireproof, rot-proof and vermin-proof. This remarkable combination of properties makes FOAMGLAS the ideal insulation for *your* plant, too.

For more facts on how to install and finish FOAMGLAS, write today.

Pittsburgh Corning Corporation

Dept. 0-125, One Gateway Center
Pittsburgh 22, Pennsylvania.
In Canada: 57 Bloor St. W., Toronto, Ontario

Owner Harry Moore indicates the grade line on the rear wall of his cooler. Bohrer & Moore was bothered with seepage of surface moisture into the adjacent freezer until it was insulated with FOAMGLAS. Engineer & Contractor was Russell Dresher, Wapakoneta, Ohio.

PNEUMATIC'S GOT WHAT YOU NEED if you want COMPLETE soluble coffee packing equipment

The special needs of packers of soluble coffee are ideally met by this Pneumatic VACUFLOW Filler. Capable of speeds to keep easy ppace with top volume productions, its dust-free action eliminates an "occupational" hazard that has been a troublesome problem in the past.

Vacuflow solves the first step in dust control by evacuating air from the container to be filled. This results in the ideal condition of particles falling undisturbed in an air free chamber. Vacuflow goes on from there to complete the filling operation, by employing the air film which surrounds each powder particle as a means of drawing the powder through an orifice into container.

AIR-CLEANING • CAPPING • LABELING, TOO!

An all Pneumatic line providing top efficiency, speed and economy, includes:

AIR CLEANERS — Semi-automatic and fully automatic models for air cleaning containers after inverting to facilitate removal of foreign matter.

PNEUMACAP — New air chuck automatically adjusts to the most finicky cap styles. Sterling cap feed eliminates tumbling and churning of caps. Single, four, six and eight head models are available for speeds ranging from 40 per minute.

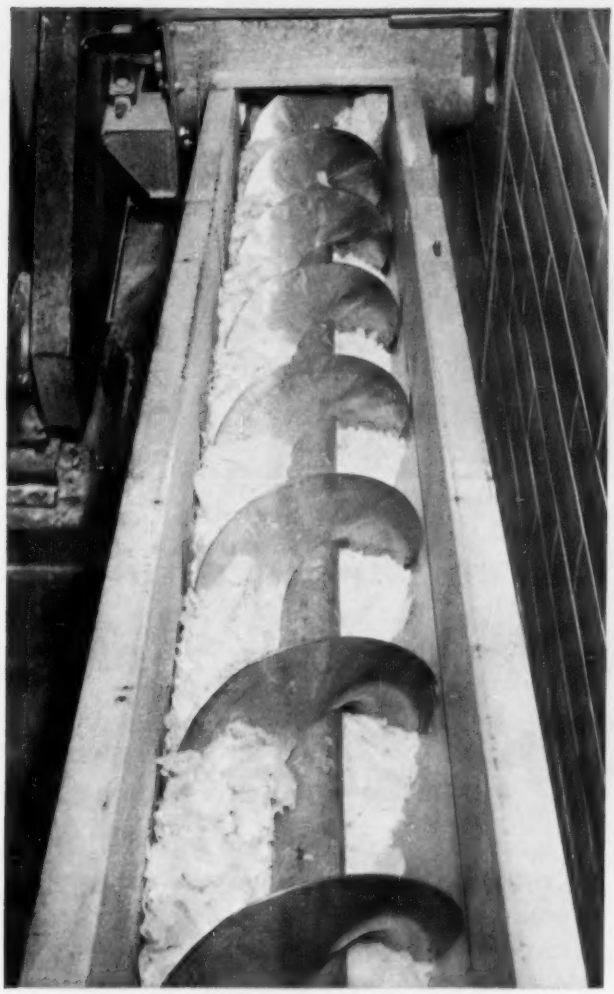
LIGHTNING LABELERS (I & II) — For round containers — handle from minimum 2″ diameter to maximum 4″ diameter. A helical intake serves to feed and space the containers as they travel straight through. A rotating glue cylinder takes the labels from reciprocating magazines — a rotating gripper cylinder transfers the glued labels to the containers. Operation is entirely mechanical — no vacuum. Speeds, 150 per minute (Lightning I), up to 300 per minute (Lightning II).

All of these containers are handled by Pneumatic equipment

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Massachusetts. *Also: New York; Chicago; Dallas; San Francisco; Los Angeles; Seattle; Leeds, England. Canadian Division: Delamere & Williams Company, Ltd., Toronto.*

★PNEUMATIC *Packaging and Bottling Equipment*

LINK-BELT offers you
COMPLETE, ONE-SOURCE SERVICE
for all your screw conveyor needs



Spotless, galvanized screw conveyor (cover removed) provides efficient, sanitary means of carrying flaked, edible material to bucket elevator and further processing.

How this 4-phase service saves you time . . . spares you details

1. **ANALYSIS AND ENGINEERING** service is provided by a district sales office in your area. From long experience, Link-Belt District Engineers can quickly ascertain the best conveying arrangement for you.

2. **COMPLETE LINE OF SCREW CONVEYOR COMPONENTS** and related elevating, conveying and power transmission equipment is your assurance that specific needs will be fulfilled most efficiently and economically.

3. **EASY ERECTION** is achieved because of prefitting, match marking, close-tolerance manufacturing and Link-Belt drawings. Link-Belt will handle entire erection assignment if you wish.

4. **SATISFACTORY PERFORMANCE** is assured when you rely on Link-Belt as a single contract source for your complete system. We will accept full responsibility for placing it in operating readiness.

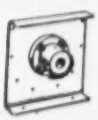
SCREWS

HANGERS

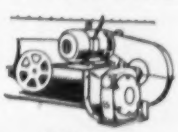
TROUGHS

SPOUTS & GATES

SHAFTS & COUPLINGS



TROUGH ENDS



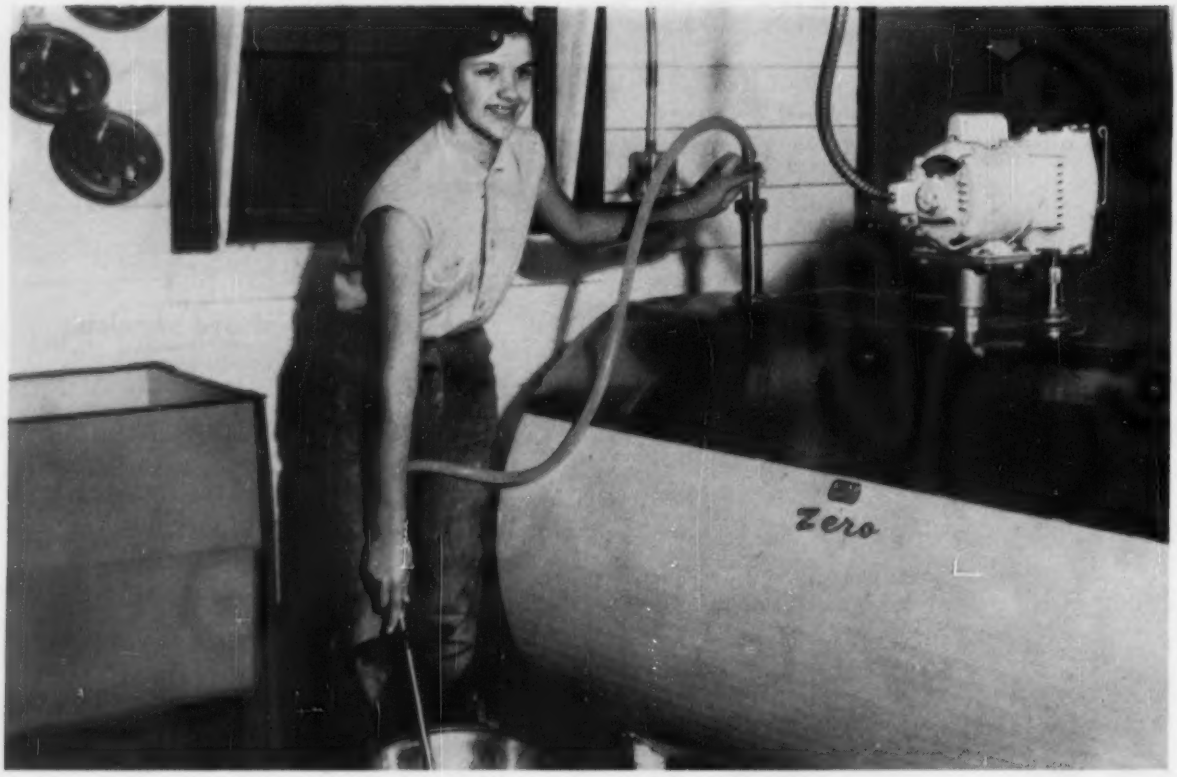
DRIVES

Here's a four-point program that provides quick and easy answers to your screw conveyor problems whether minor or complex. Whatever you need in components . . . and to whatever extent you require engineering supervision—Link-Belt will devise a system "tailored" to your requirements, correlating all factors to assure you of finest performance. For more facts, call your nearby Link-Belt office.

LINK-BELT

SCREW CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



To guard against oil contamination on a shaft-down agitator application

NEW MILK COOLERS DEPEND ON Century Performance-Rated® GEARMOTORS

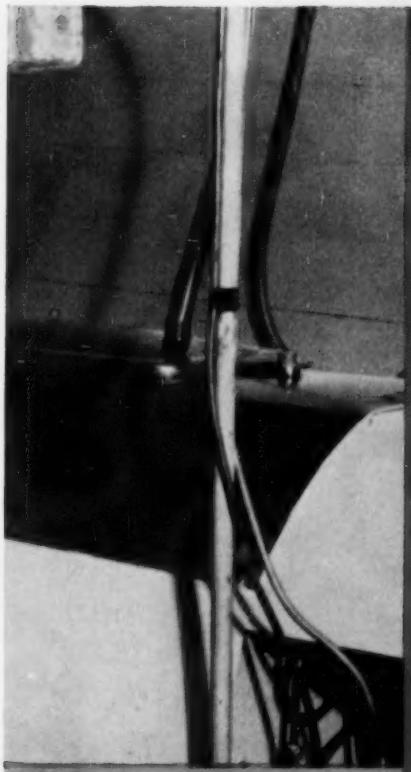
Century Performance-Rated Gearmotors are playing an important part in making possible this new era in milk handling. Slow agitation is important to chill the milk quickly and evenly in the cooler. Ordinary agitator motors mounted shaft-down, dripped oil into the milk. Century's unusually reliable standard shaft seal has virtually eliminated this problem.

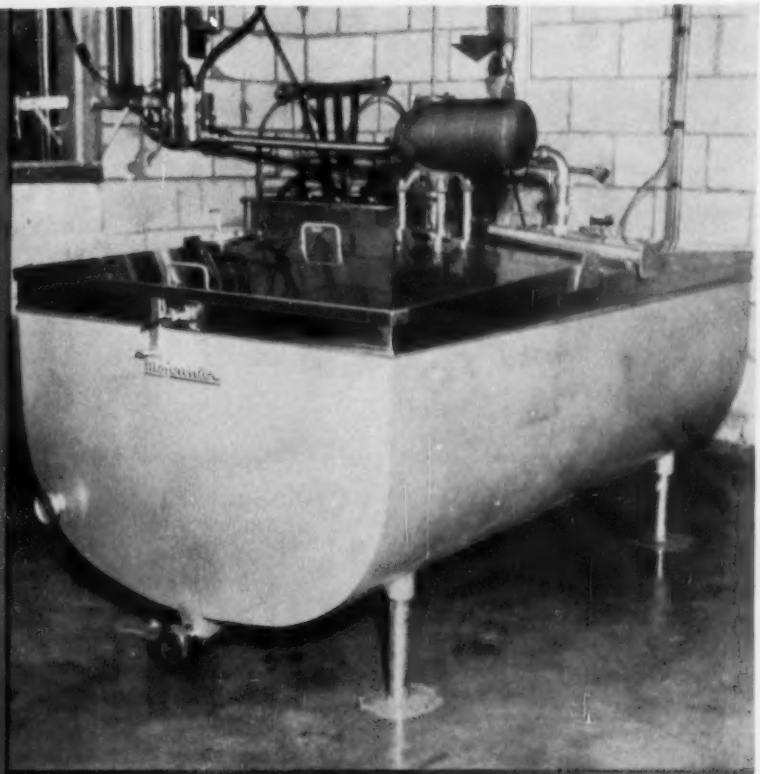
Furthermore, a motor must be "washable" if it is to be used in the sanitary milkhouse. Century can supply a pedestal-mounted gearmotor with a specially designed smooth-contour cover. This cover eliminates most crevices in which dirt could collect, and it protects the motor from moisture . . . even when it's washed down.

Could your processing operation be improved by Century Motors, Performance-Rated to give you the correct speed, protection and freedom from contamination? We will be happy to discuss your problems with you.

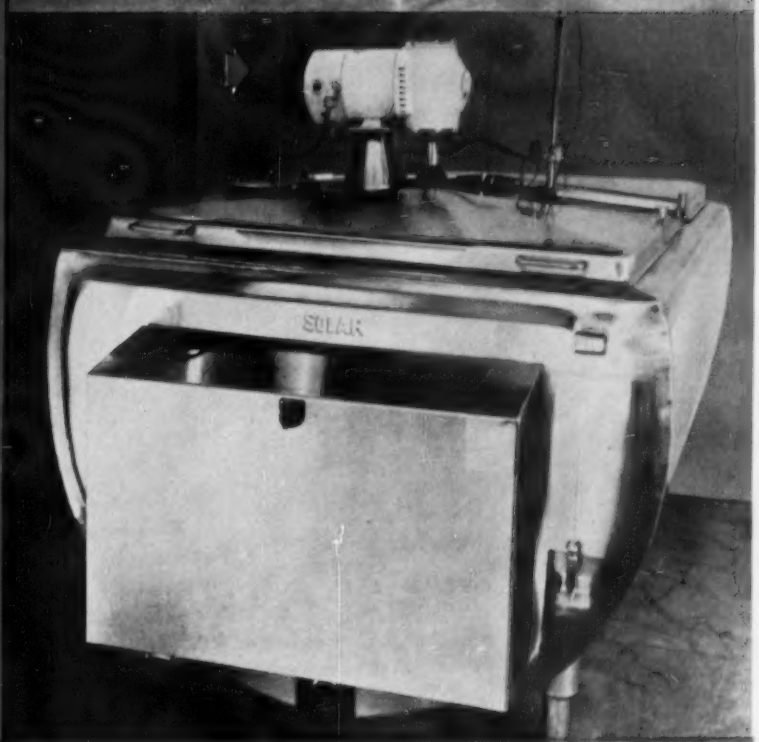
For full data call your nearest Century Sales Office or Authorized Distributor.

46





NEW PROFIT AND EFFICIENCY in milk handling is made possible for even small and medium-sized dairymen using these ingenious new bulk milk coolers. By drawing the fresh milk directly into the cooling tank for storage, bacteria counts are kept at a minimum, butterfat content is preserved. Leading manufacturers of these popular new milk coolers equip them with Century Gearmotors.



Performance Rated©
MOTORS
1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

For more data, circle this page number on card at back →

Satisfaction rests on the carton

Purchasing executives
for large users of shipping containers
make up a blue ribbon packaging jury.
They base their decisions on facts:
boxes can be thoroughly tested for performance,
expertly judged for good design and printing. That is why
the roster of leading companies which have chosen Union
as one of their major sources for corrugated boxes is important to you.
Ask to see this constantly-growing list: it tells its own story.

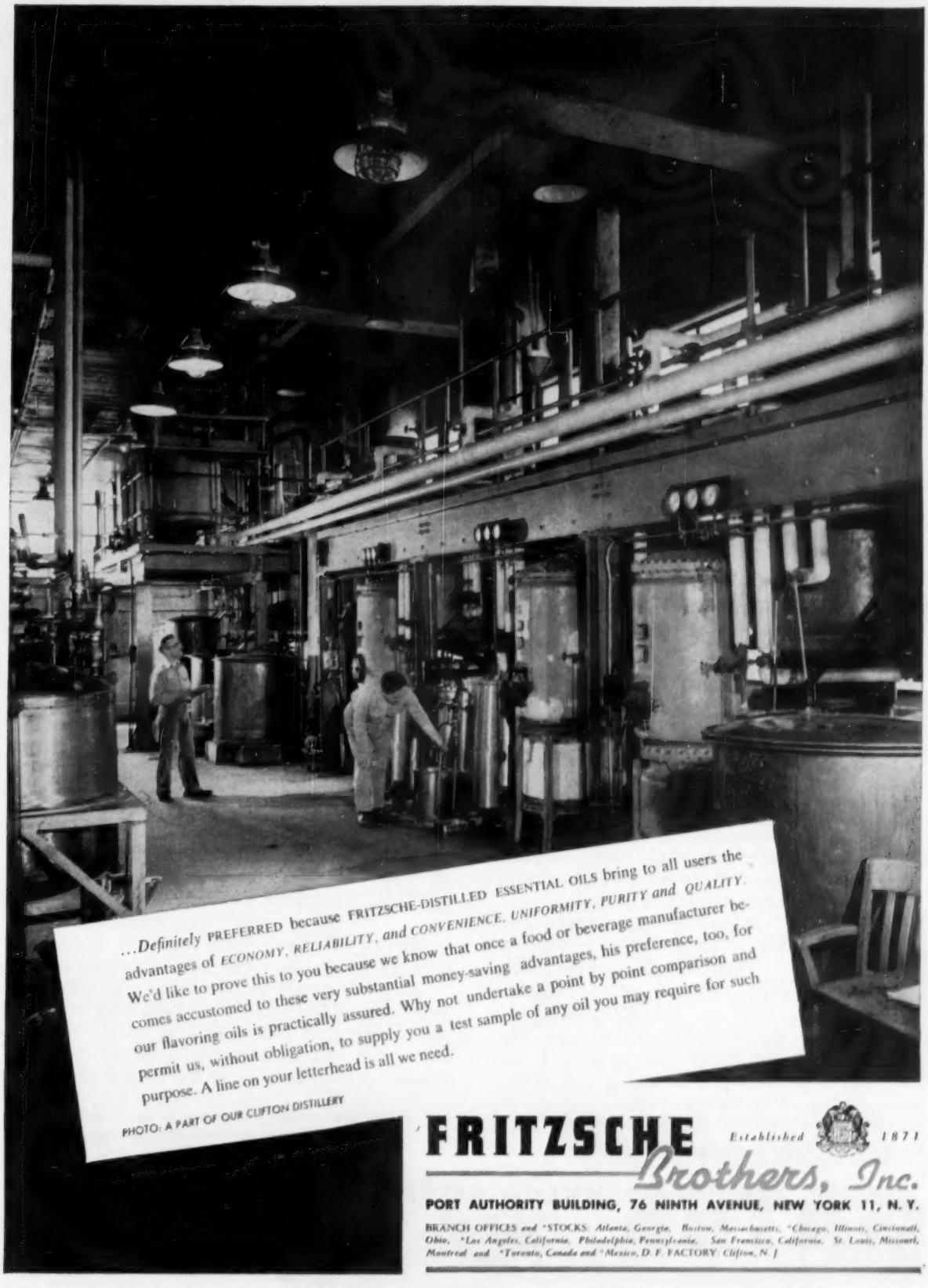
TRADE MARK
UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

PREFERRED...



...*Definitely* PREFERRED because FRITZSCHE-DISTILLED ESSENTIAL OILS bring to all users the advantages of *ECONOMY, RELIABILITY, and CONVENIENCE, UNIFORMITY, PURITY and QUALITY.* We'd like to prove this to you because we know that once a food or beverage manufacturer becomes accustomed to these very substantial money-saving advantages, his preference, too, for our flavoring oils is practically assured. Why not undertake a point by point comparison and permit us, without obligation, to supply you a test sample of any oil you may require for such purpose. A line on your letterhead is all we need.

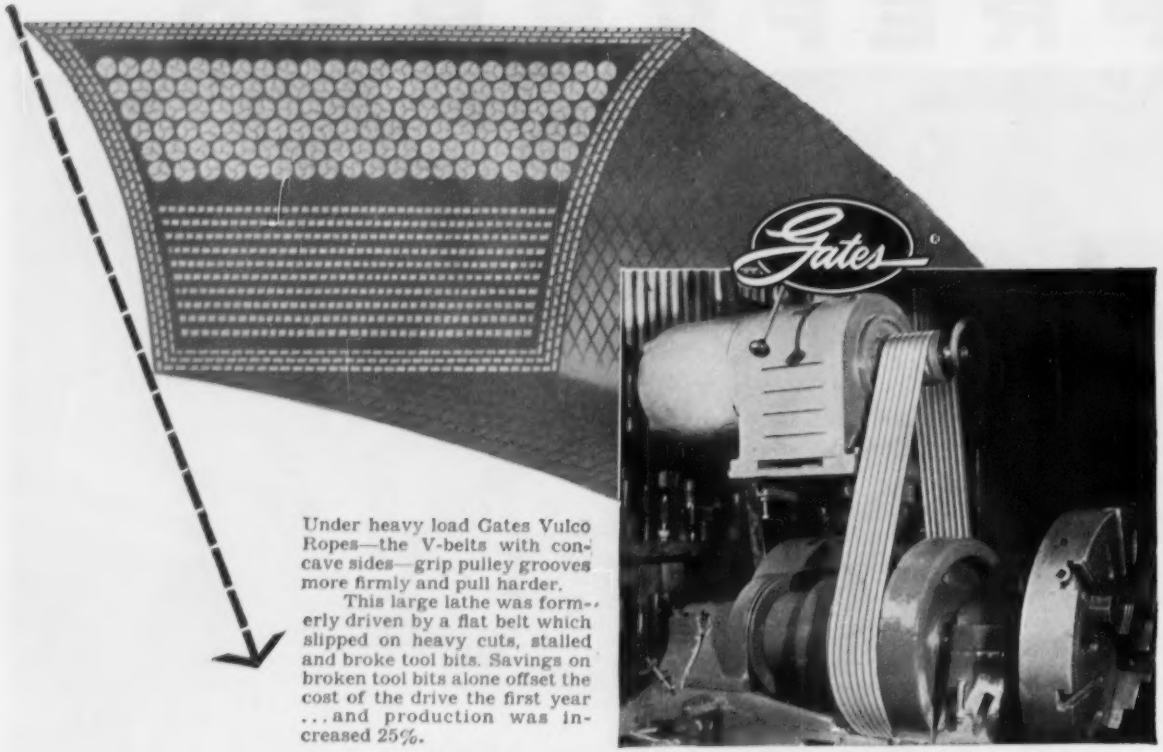
PHOTO: A PART OF OUR CLIFTON DISTILLERY

FRITZSCHE Established 1871

Brothers, Inc.

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, St. Louis, Missouri, Montreal and *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.*



Under heavy load Gates Vulco Ropes—the V-belts with concave sides—grip pulley grooves more firmly and pull harder.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year ...and production was increased 25%.

Concave sides keep belt costs down!

Industry is saving thousands and thousands of dollars every year by specifying Gates Vulco Ropes—the V-Belts with *concave sides* (U.S. Pat. No. 1813698).

Here's the interesting reason *why* Gates belts save money:

On the bend around the sheave the *precisely engineered* concave sides (Fig. 1) of the Gates belt fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley. That means sure pulling power and *even distribution of wear*. Longer wear, fewer replacements cut belt costs...reduce down time...contribute to profits.

Simple test proves value of concave sides

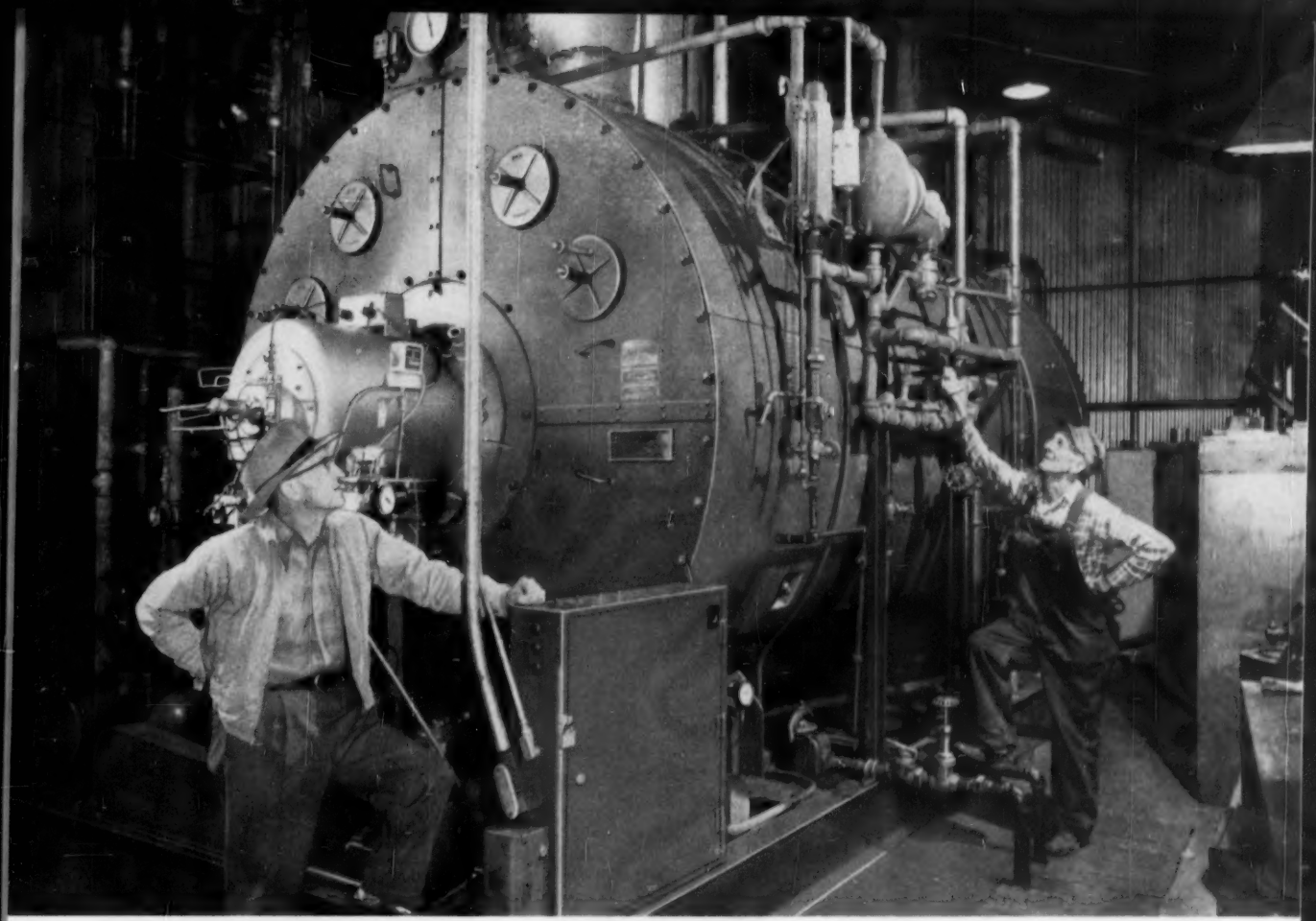
Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. The bulging sides prevent the belt from fitting evenly in the pulley groove (Fig. 2-A). Uneven contact causes uneven wear...shortens belt life...increases costs.

Keep belt costs *down* by specifying Gates Vulco Rope Drives—the V-Belt with *concave sides*. Belts you need are readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 25-A

GATES VULCO ROPE DRIVES



Why does ONE *Powermaster*® sell OTHERS in nearby plants?

You get MORE than Operating Efficiency with Powermaster

- ★ Low-cost, space-saving installation
- ★ Fast steaming
- ★ Instant response to load changes
- ★ Quick fuel change-overs
- ★ Clean, dry steam
- ★ Automatic operating and safety controls
- ★ High fuel economy at all loads
- ★ Clean, quiet operation
- ★ Smokeless combustion
- ★ One-source responsibility for complete unit
- ★ Nation-wide factory-trained service organization
- ★ Pay-As-You-SAVE Purchase Plan

This 500 HP *Powermaster* Packaged Automatic Boiler installed in a West Coast food processing plant has led to the purchase of four *Powermaster* units by other companies in the same area.

The reason for these extra sales is because *Powermaster* is solving two steam problems—more steam for processing, and more efficient off-season heating by means of modulating control of firing rate.

You can now purchase a completely factory-assembled and fire-tested *Powermaster* on the new Pay-As-You-SAVE Purchase Plan that helps you pay for your new boiler out of the savings it brings you.

Write for Bulletin 1220 or ask our representative to tell you how *Powermaster* can meet your requirements.

Powermaster®

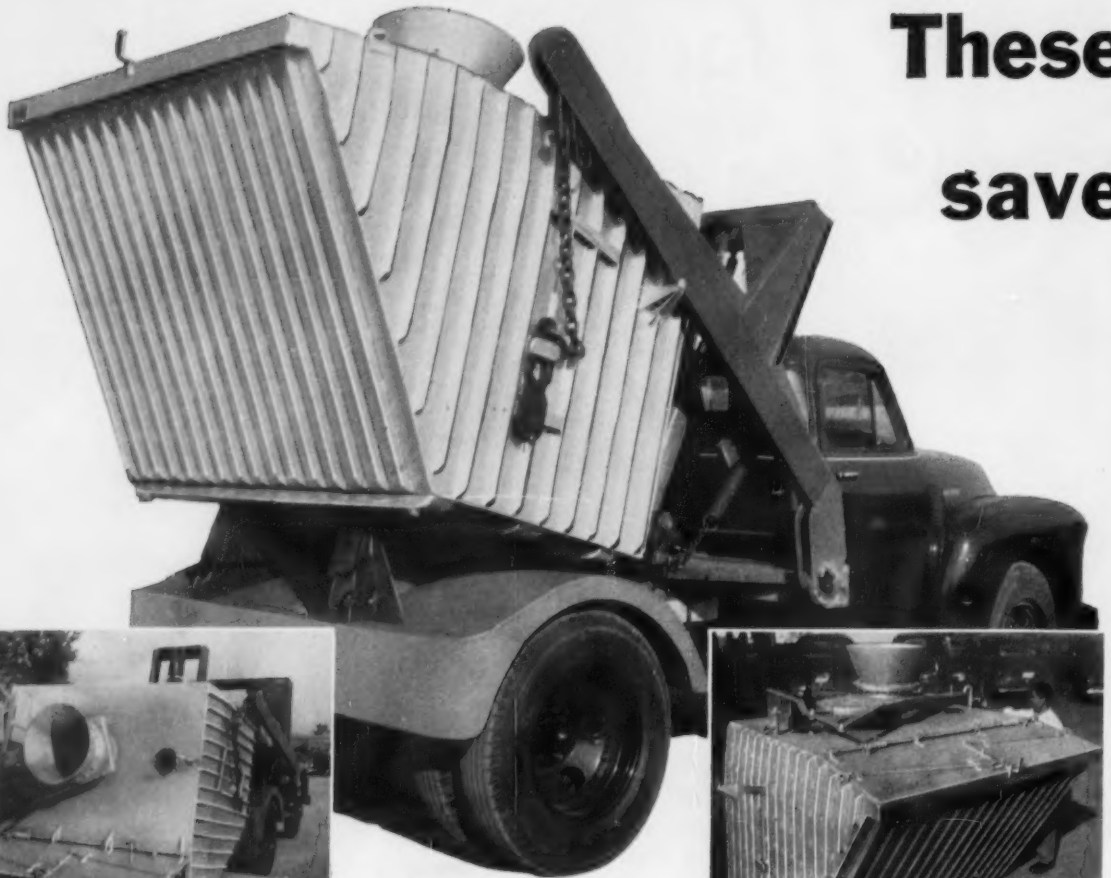
PACKAGED AUTOMATIC BOILERS

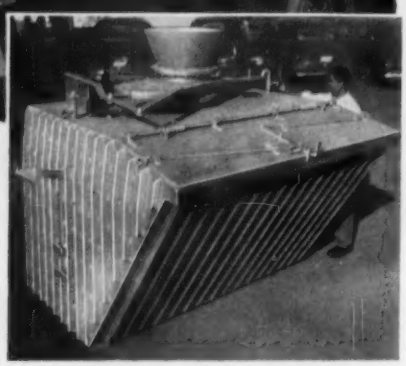
In sizes to 500 HP; pressures to 250 psi.

ORR & SEMBOWER, INC.

Established 1885 • Morgantown Road, Reading, Pa.

These save



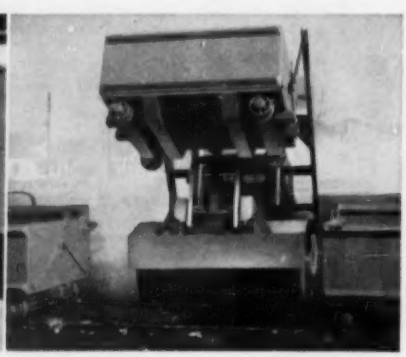


Dempster-Dumpster serving a 6 cu. yd. container with cooling fins for handling a high temperature product.

Here are a few of the hundreds of Detachable Containers we have built to solve handling problems of every description. A few others not shown include those with compartments . . . with insert containers . . . fully-insulated . . . lined with lead . . . lined with fire brick . . . with windows and doors . . . with casters . . . flat bottoms and open at one end . . . with teeth . . . with shelves for tools and supplies—and we could describe hundreds more, all served by one Dempster-Dumpster and only one man, the driver.

This 3 cu. yd. Container has skids for fork lift truck transfer.

10 cu. yd. Container widely used for refuse and combustible wastes.



Flanged wheel equipped containers for remote loading.

5176

DEMPSTER

4 manufacturers to $82,000.00 annually handling waste materials!

These four industrial plants expect to save, in labor costs alone, during the first five years service of the Dempster-Dumpster System—

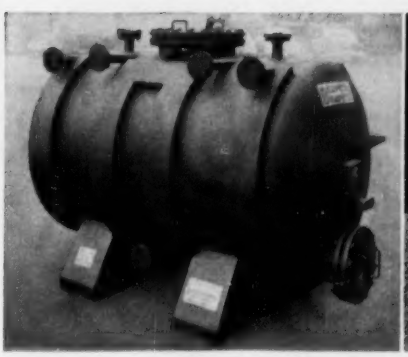
A PLASTICS PLANT: $26,958.00 savings on an investment of $9,523.50 in Dempster-Dumpster equipment. Savings alone pay for equipment in two years.

A CHEMICAL PLANT: $204,076.75 savings on an investment of $40,968.00 in this equipment . . . savings pay for equipment in one year.

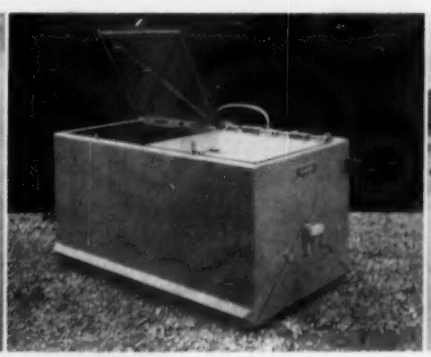
AN AUTOMOTIVE PLANT: $135,000.00 savings on an investment of $19,272.00 . . . savings pay for equipment in 9 months.

A PAPER AND PULP MILL: $43,104.00 savings on an investment of $10,750.00 . . . savings pay for equipment in 1¼ years.

Those are typical examples. Visualize a Dempster-Dumpster, operated by only one man, the driver, serving scores of big steel containers, one after another, in your plant. Containers of many designs and types, handling waste or salvable materials, raw or finished products, fluids including acids, combustibles, dusty materials—anything that can be handled in up to 21 cu. yd. detachable Dempster-Dumpster Containers . . . payloads up to 19 tons. Savings are tremendous! Take advantage of our free engineering service, which determines by fact-finding survey the cost cutting possibilities of this system in your plant. Dempster Brothers, Inc.



600 Gal. stainclad tank with brine cooling channels.



A Container available up to 10 cu. yds. with or without lids for many uses.

A 9 cu. yd. container for handling packaged products.

BROTHERS 7125 SHEA BLDG., KNOXVILLE 17, TENNESSEE

what do you need?—Angelica has it!

For the largest selection of uniform designs and materials, hundreds of plants from coast to coast rely on the world's largest manufacturer of washable uniforms—Angelica!

Whatever your reason for uniforms, whether it is appearance, sanitation or safety, Angelica can give you exactly what you need!

Do your uniforms take a lot of punishment in the plant and in the laundry? Quality fabrics like Angelica's exclusive Monte* Cloth and Armor* Cloth assure longer wear!

You can choose from Angelica's huge stock of styles and fabrics. Or if you have a unique problem requiring special uniform features, Angelica can solve that, too!

Send your uniform problem to Angelica. WRITE TODAY!

Angelica UNIFORMS

*T. M. Reg.

1427 OLIVE, ST. LOUIS 3 • 107 W. 48th, NEW YORK 36 • 177 N. MICHIGAN, CHICAGO 1 • 110 W. 11th, LOS ANGELES 15

To this good old world... *In the good old way,*

What has anyone ever found better to say

Than

May you be peaceful

Healthy, and glad—

May the New Year

Be better

Than any you've had!

May you enjoy

Every blessed minute!

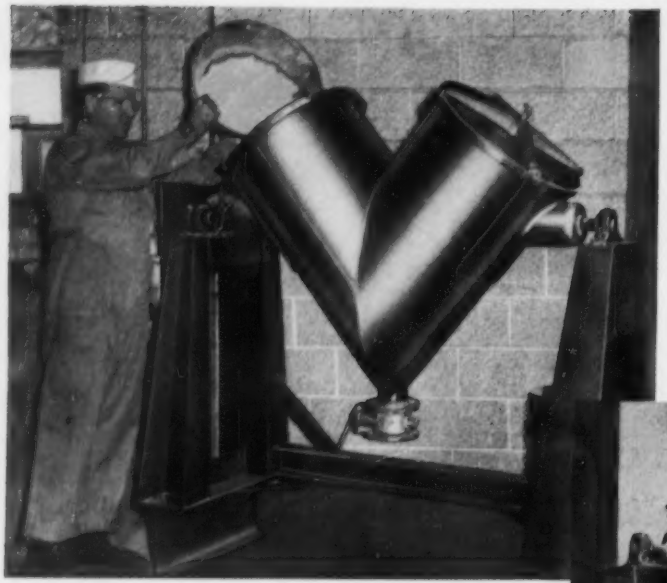
It's wished from the heart,

And our whole heart's in it.

Norda

Norda ®, 601 West 26th Street, New York 1, N. Y.

CHICAGO • LOS ANGELES • SAN FRANCISCO • MONTREAL • TORONTO • HAVANA • LONDON • PARIS • GRASSE • MEXICO CITY



Charging a **p·k** Twin Shell Blender through one of the two large access ports at O. M. Franklin Serum Co. plant in Denver, Colo.

Complete discharging through butterfly type valve.

This p·k Twin Shell Dry Blender† gives Denver livestock supply house

"A Thorough Mix of Dry Materials" *

"I have been in charge of various types of production, for the past fourteen or fifteen years" says Kevin M. Curyea, manager of the manufacturing division of O. M. Franklin Serum Co., "but I think this machine (a 5 cu. ft. capacity **p·k** Twin Shell Dry Blender) is one of the best buys I have ever made. It is simple to load and unload, it is efficient and fast, and it takes up a very minimum of space."

"The average time to blend our dry powders," Mr. Curyea estimates, "is from four to six minutes." And, he adds, "the machine can be cleaned up easily in five minutes."

There is a **p·k** blender that will make *your* dry mixing operations faster, more thorough and more efficient. Write today for full information.

**All quotations on this page are from a signed letter from Mr. Curyea to the Patterson-Kelley Company, Inc.*

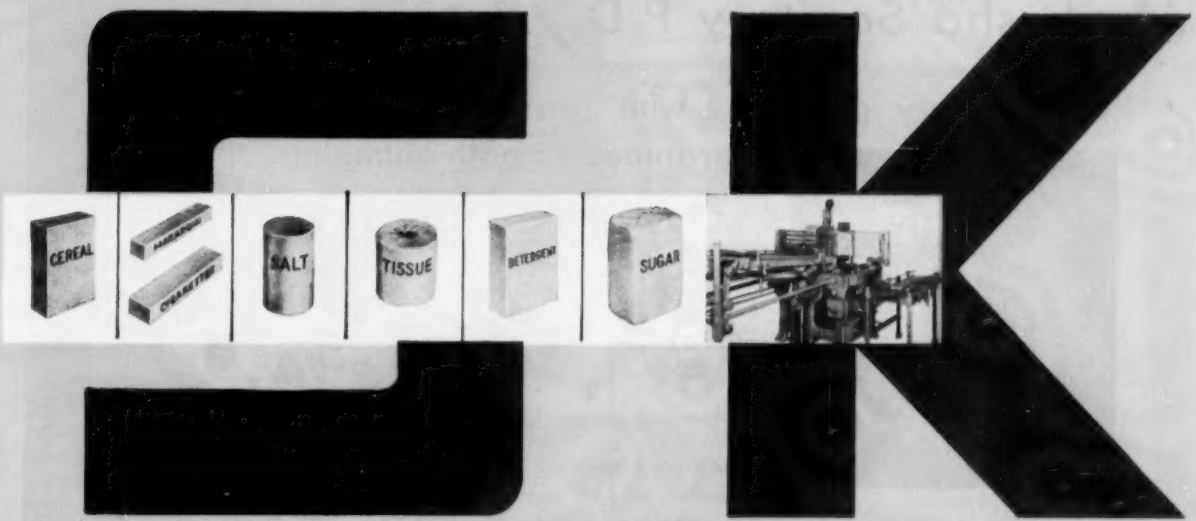
the **Patterson-Kelley Co.,** inc.

1620 Lackawanna Avenue, East Stroudsburg, Penna.

† Patented

101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities.

every user of STANDARD-KNAPP 800 PACKERS is saving money



we can help YOU reduce packing costs for cartons, cans, bags or . . .

There are several reasons why Standard-Knapp case packers — and all other S-K equipment, too — **SAVE MONEY**. First, they are engineered by men with unequalled experience in package handling methods. Second, they are built to synchronize precisely with your line requirements. Third, they have behind them a service organization with unparalleled know-how. If you really want to put your package into a case at the lowest possible cost, take it up with Standard-Knapp.

Please write Dept. F for descriptive catalogs.

S-K **STANDARD-KNAPP**

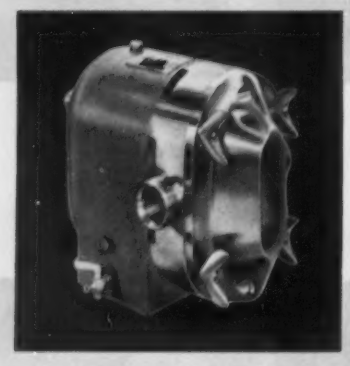
DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

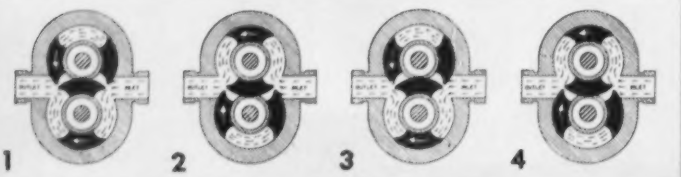
LATIN AMERICAN REPRESENTATIVES: American Steel Export Company, New York, N. Y.

You don't macerate delicate food products or cause spoilage when you use a Waukesha Sanitary P.D.* Pump

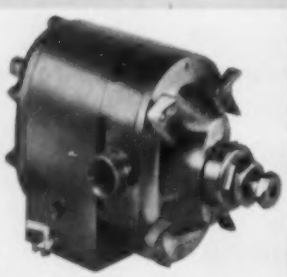
. . . this sanitary pump . . . with positive displacement action guarantees smooth pumping operation



. . . is so simple to disassemble, wash, sterilize and assemble. The smooth surfaced O-Ring rotary seal flips out easily and snaps back in place with slight pressure.



The product flow diagram illustrates the position of the twin blade impellers at each quarter turn of the rotors. The four large chambers draw in and discharge four full loads with every revolution. This action is so precise, so closely timed that the product-flow is smooth and even—practically without pulsation.



Waukesha Vented Pumps are easily adjusted for back pressure.

Waukesha Variable-Speed Pump for use with high-temperature, short-time pasteurizers or wherever a variation in capacities is required.

* Positive Displacement Sanitary Pump.

• You don't break down vegetables and meat products in soups, fricassees, or creamed soups; crush cherries or strawberries in jams, jellies, or pie fillings; break up fat globules in milk; aerate baby foods, when you employ a Waukesha positive displacement pump in your plant.

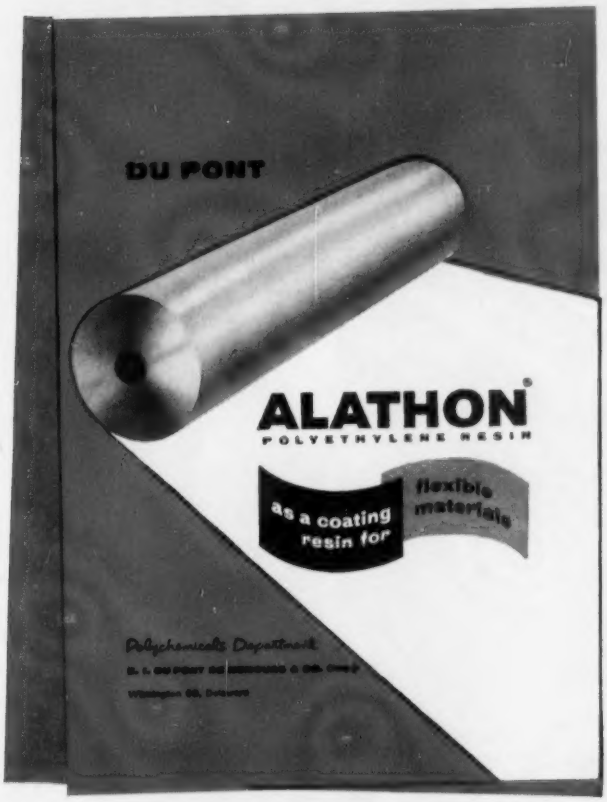
The Waukesha P. D. pump is designed for pumping food products . . . it handles products gently . . . without damaging their structure. Due to the slow speed, positive action of the Waukesha P. D. pump with its large open chambers and twin blade impeller delivery, your food products are pumped out as they go in, without damage or waste.

Vital to any canning or packing plant is sanitary operation. The entire Waukesha pump is easily disassembled and assembled, especially with the exclusive O-Ring rotary seal. Every part in contact with food is designed for quick, easy washing and sterilizing. There are no hard-to-reach recesses. All parts are smooth and flush—completely sanitary in construction. Furthermore, the corrosion-resistant metal imparts no flavor to the food.

Write Waukesha Foundry Company, Waukesha, Wis., Dept. 12A, for complete information.

Waukesha Foundry Company

HERE'S MORE HELP FROM DU PONT:
New booklet full of information on packaging with ALATHON®



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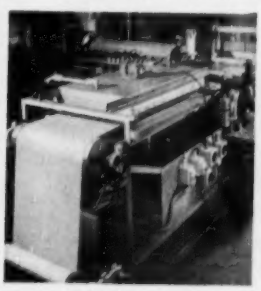
. . . AND A NEW LABORATORY TO SERVE SUPPLIERS OF FLEXIBLE PACKAGING MATERIALS



• In this new laboratory near Wilmington, Delaware, specialists in extrusion coating help customers solve coating problems, develop new processing techniques.

Here's an informative 36-page booklet which describes the properties of Du Pont "Alathon" polyethylene resin, the methods for applying it to flexible packaging materials, and interesting uses for the resulting laminations.

GET YOUR FREE COPY of this helpful booklet—just fill out and mail the coupon below.

DU PONT

ALATHON®
POLYETHYLENE RESIN

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Which type of package are you interested in?

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board cartons
- ☐ Board trays
- ☐ Fiber drums
- ☐ Corrugated boxes
- ☐ Fiberboard containers

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 5412, Du Pont Bldg.
Wilmington 98, Delaware

Please send me information on the properties and advantages of "Alathon" polyethylene resin for coating applications.

*Name*_____

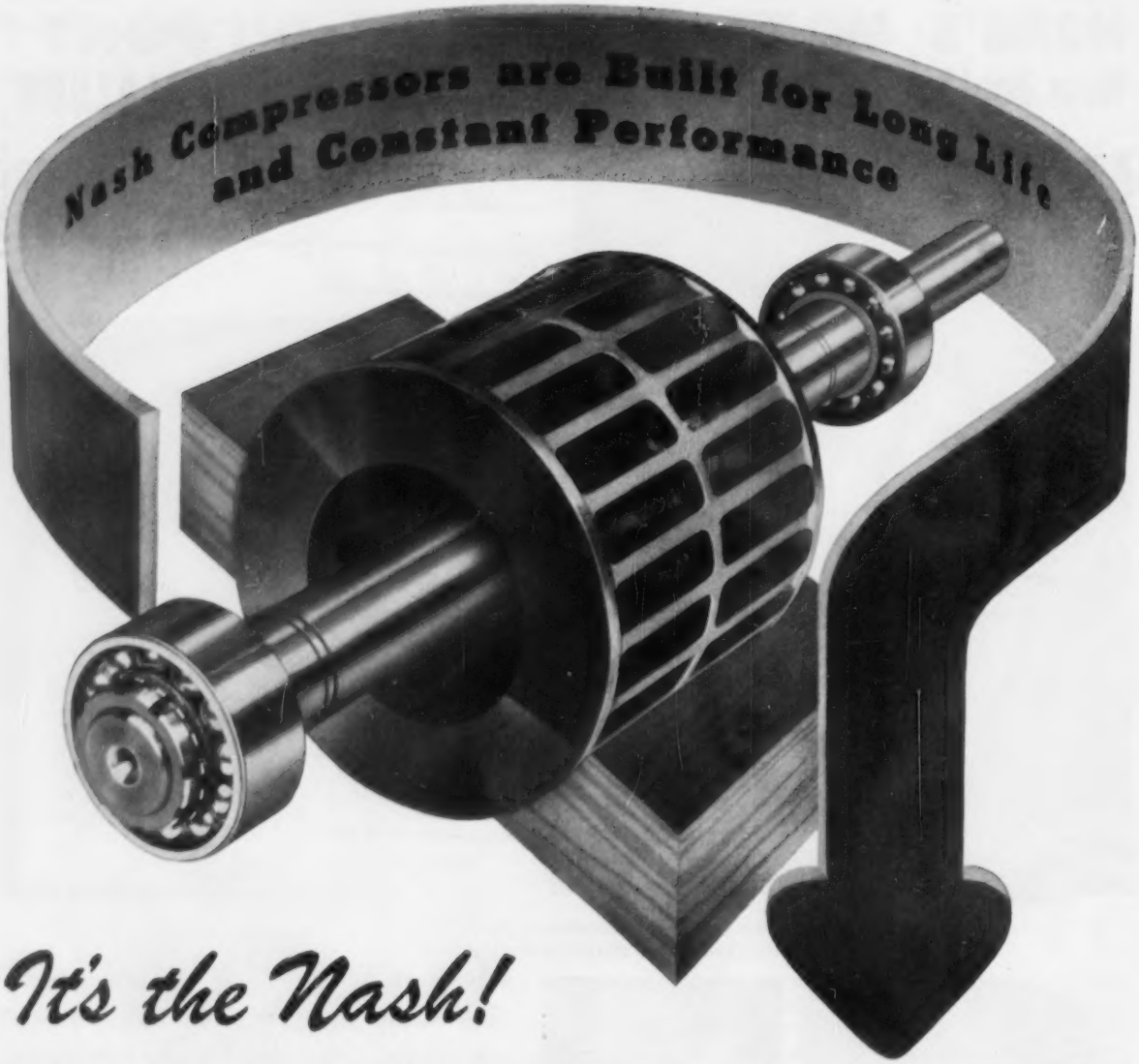
*Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

For more data, circle this page number on card at back →



It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

NASH ENGINEERING COMPANY

312 WILSON, SO. NORWALK, CONN.

DOW PROPYLENE GLYCOL, U. S. P.

HIGH-EFFICIENCY SOLVENT FOR FLAVORS AND COLORS

Gaining wide acceptance for versatility and economy . . . a good bet for improving your products, too

Big reason for the wide acceptance of Dow propylene glycol, U.S.P., is its extremely high solvent ability. Natural result of this efficiency is greater economy of manufacture. You'll find these advantages of propylene glycol extending over a wide range of flavoring raw materials, too.

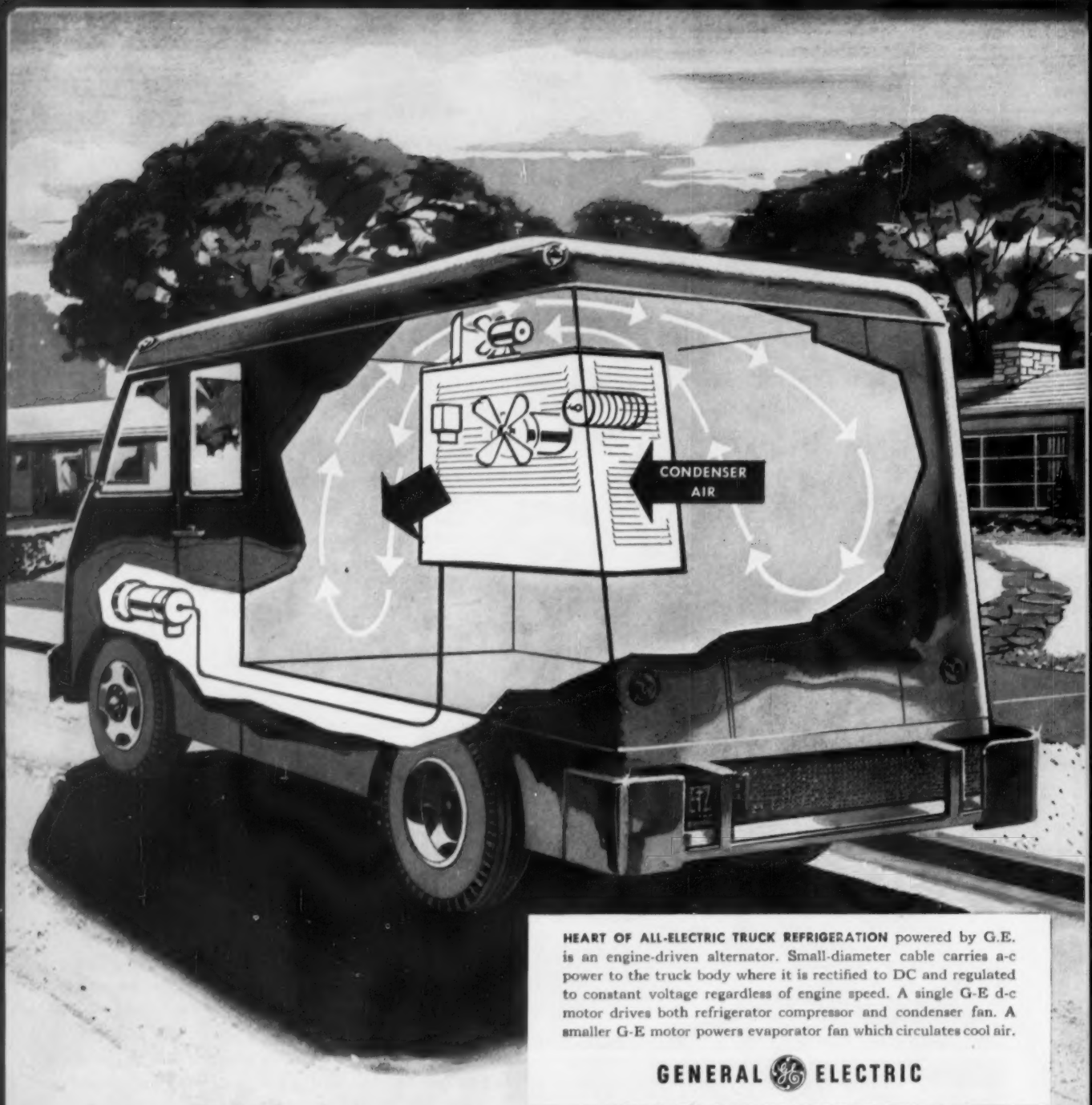
Food colors, emulsified flavors and flavor concentrates also benefit from propylene glycol's excellent solvent action. Many makers of food colors have replaced other solvents with propylene glycol with remarkable savings and only minor reformulation. A big advantage in formulating emulsified flavors is gained by the wetting action of propylene glycol which increases the stability of these emulsions.

The dependable quality and prompt delivery of Dow propylene glycol, U.S.P., can simplify your production and scheduling. For a free sample and property information, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 809E-1.

you can depend on DOW CHEMICALS

DOW

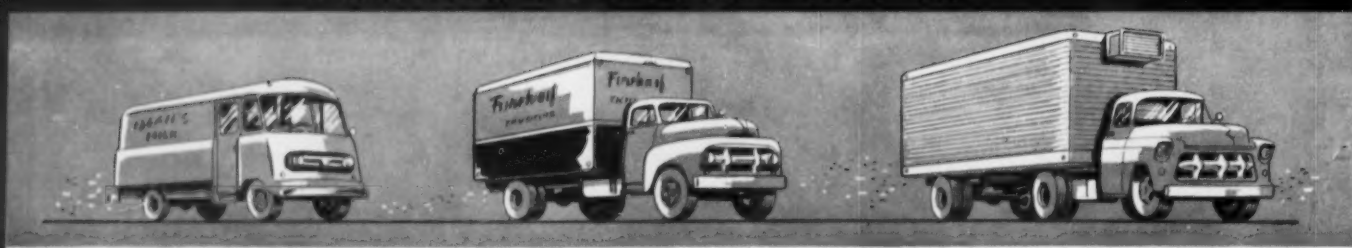
For more data, circle this page number on card at back →



HEART OF ALL-ELECTRIC TRUCK REFRIGERATION powered by G.E. is an engine-driven alternator. Small-diameter cable carries a-c power to the truck body where it is rectified to DC and regulated to constant voltage regardless of engine speed. A single G-E d-c motor drives both refrigerator compressor and condenser fan. A smaller G-E motor powers evaporator fan which circulates cool air.

GENERAL ELECTRIC

A RATING FOR EVERY SIZE TRUCK



1/2- and 3/4-ton systems provide 40-degree temperatures for retail milk delivery. Also ideal for local delivery of other perishables including flowers and beverages.

1- and 1 1/2-ton systems have refrigerating capacity for small- and medium-size trucks used for wholesale delivery of produce, meat, frozen foods, and ice cream.

3-ton systems are designed for large over-the-road trucks and semi-trailers for long-distance movement of produce, frozen foods, and other perishable commodities.

Easily installed to operate off truck engine, the rugged G-E alternator produces 90-volt power for en-route cooling.

More room for payload results from the compactness of encased system electrical components and refrigeration equipment.

Convenient plug-in to adequately fused a-c outlet provides power for uninterrupted cooling during stand-by hours.

New all-electric truck refrigeration powered by General Electric cools round-the-clock, cuts over-all costs

IN-TRANSIT AND STAND-BY COOLING COMBINED IN ONE COMPACT, DEPENDABLE SYSTEM

Today the convenient, dependable, low-cost way to refrigerate your trucks is with new **all-electric** refrigeration powered by General Electric. Truck-refrigeration manufacturers now offer complete equipment designed around G-E electrical systems. There are units for local retail and wholesale trucks and over-the-road semi-trailers, for either cooling or freezing temperatures.

24-HOUR OPERATION

All-electric truck refrigeration powered by G.E. is 24-hour refrigeration. In-transit power is provided by a special under-the-hood G-E generator with capacity for full cooling even when the truck engine is idling. During off hours, the system operates by plug-in to a conventional a-c electric outlet.

MANY COST-CUTTING BENEFITS

All-electric truck refrigeration offers many benefits over other cooling methods —including constant temperatures, longer runs, bigger pay loads, and elimination of truck-body rust. And many types of products can now be successfully refrigerated for the first time with this new system.

SEE YOUR SUPPLIER TODAY!

If you operate trucks which require or could benefit from economical refrigeration, it will pay you to discuss new **all-electric** truck refrigeration with your equipment supplier before you commit another dollar of equipment investment.

Progress Is Our Most Important Product

GENERAL ELECTRIC

FOR MORE INFORMATION

General Electric Company,
Section B704-60, Schenectady, N.Y.

Please send me your new Bulletin GEA-6084A describing the G-E electrical system for all-electric truck refrigeration.

NAME .....

TITLE .....

COMPANY .....

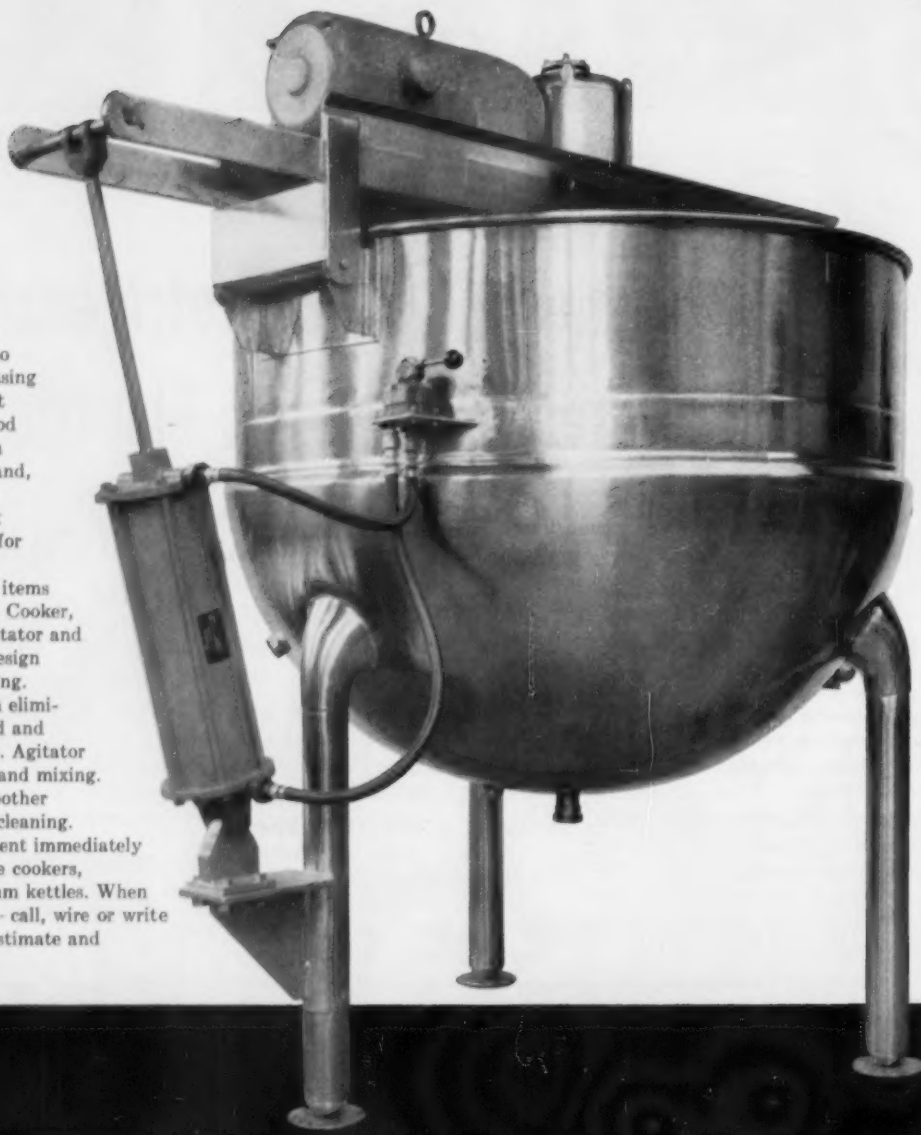
STREET .....

CITY ..... STATE .....

When You Need a Kettle Quick!

HAMILTON

CG mix cooker



Seasonal demands force many of our customers to make last minute purchasing decisions and require fast delivery on orders for food processing equipment. In anticipation of this demand, we carry most of our standard kettles and mix cookers in stock – ready for prompt shipment.

One of these standard items is the Hamilton CG Mix Cooker, with Double Motion Agitator and Hydraulic Lift. Kettle design provides fast, even cooking. Streamlined construction eliminates crevices where food and bacteria normally collect. Agitator insures perfect blending and mixing. Hydraulic Lift gives smoother operation and simplifies cleaning.

Other types of equipment immediately available include pressure cookers, tilting kettles, and vacuum kettles. When you need a kettle quick – call, wire or write Hamilton – for prompt estimate and delivery information.

HAMILTON Copper and Brass Works

Division of Brighton Copper Works, 824 State Avenue, Cincinnati 4, Ohio

Inside the shopping bag ...there's a lot of Atlas sorbitol and emulsifiers

To help fill the nation's shopping bags, Atlas sorbitol and emulsifiers offer a bag of tricks for food chemists. Sorbitol helps retain the original taste, texture, and softness during storage . . . and often helps to untangle production problems by cutting processing time, reducing waste or simplifying handling.

Atlas emulsifiers unite water with fats and oils to produce distinctive improvements in eating quality and appearance of many foods. The world's largest producer of food emulsifiers, Atlas makes a varied line of high and low mono Atmul® and Atmos® emulsifiers for many food products . . . including bread, sweet goods, ice cream, shortening, and packaged dry mixes. High mono Atmuls, the most recent development of Atlas research, offer you a unique combination of high "mono" content for superior emulsification, plus a "diglyceride bonus" to assure thorough dispersion of the mono in the food product. For data, samples and technical assistance in application write or call Atlas today.

FOOD INDUSTRY DEPARTMENT

ATLAS

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, CANADA

For more data, circle this page number on card at back →

The new Six-Wheeler has 181½" wheelbase, 250A Mustang Engine, 507B transmission, SBD1555 tandem axle, ratios 5.57-6.80. Tire size 10.00x20. Air brakes. Body is 22 ft. long, 7 ft. high.

Payloads Going UP! Delivery Costs DOWN!

with WHITE 3000 Fleet

YOU CAN do more work with a WHITE 3000!

Look at the record of Burg Trucking Corp., New York—with their modern fleet of Whites.

Operating in heavy-traffic areas, President Morris Burg wanted to go to bigger delivery units, but did not want to sacrifice on maneuverability and driving ease.

On new White Six-Wheelers body length was increased to 22 ft. for substantial boost in capacity—nearly 3 ft. longer without increasing overall length. "We handle more payload—more deliveries—with substantially the same operating costs," Mr. Burg says.

THE WHITE MOTOR COMPANY • *Cleveland 1, Ohio*

Morris Burg, President
Burg Trucking Corp.
New York City

Michael Cohen, Manager
Food Fair Stores, Inc.
Meat Packing Division
Elizabeth, N. J.

Modern Six-Wheelers Add Efficiency to BURG TRUCKING Corp. Operations

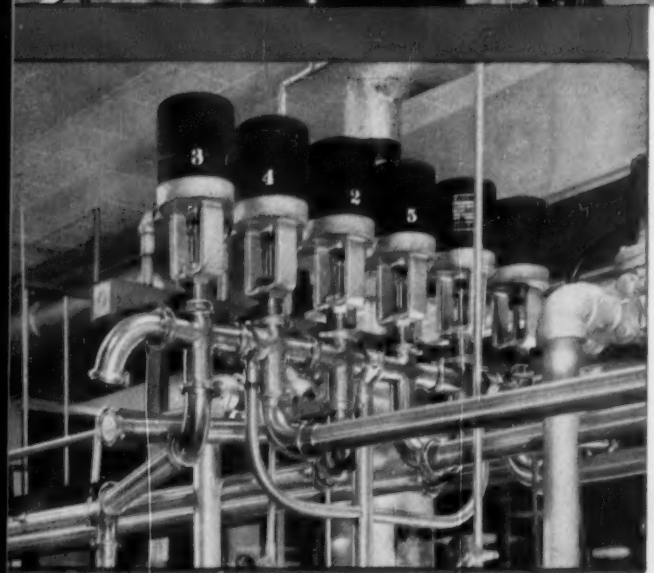
MODERN methods of meat handling and distribution include the White 3000 as used by Burg Trucking Corp. for Food Fair Stores and from New York's Washington Market rail heads and slaughter houses to wholesalers and chain warehouses in Greater New York, Albany, Philadelphia and many points in New Jersey.

Burg Trucking Corp. has been using Whites since 1944 . . . now has a modern fleet of 40 units, 26 of which are White 3000's.

Aluminum body is specially insulated with reinforced roof and floors. Overhead rails handle carcass meat on hooks. Below 30° temperature.

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

TRI-CLOVER Fittings and Valves play a sparkling role at Vernor's "DREAM PLANT"



• Shown above in the Syrup Mixing Room at the new Vernor's plant are six motor actuated Tri-Clover Compression Valves. All are joined in place with sanitary, stainless steel Tri-Clamp Fittings.

• Shown at left in the Extract Room is a stainless steel In-Line Filter and numerous Tri-Clamp Fittings. On the side of the tank is another automatic, motor actuated Tri-Clover Compression Valve.

One look at the new sparkling clean James Vernor Company ginger ale plant in Detroit and you know why it is called a "dream plant." It has also been described as the largest, most efficient and most attractive soft drink plant in the world . . . with a capacity of approximately 6 million 8-ounce drinks in a 24-hour period.

To help make this new plant the marvel of sanitation and automatic operation that it is, Vernor's have installed a whole battery of Tri-Clover sanitary stainless steel fittings, valves and accessory equipment in a major portion of their vast network of processing lines. You'll find Tri-Clover fittings and valves in the Syrup Storage Room, in the Mixing Room, in the Extract Room, in the Bottling Room, and in conveying lines connecting these operations. All lines are cleaned in place by the latest recirculation methods.

Like Vernor's and many other modern plants, you can achieve new standards of efficiency and sanitation in your bottling operations with Tri-Clover sanitary fittings, valves, pumps, tubing and allied specialties, including both cleaned-in-place and "take-down" lines.

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

See your nearest TRI-CLOVER Distributor

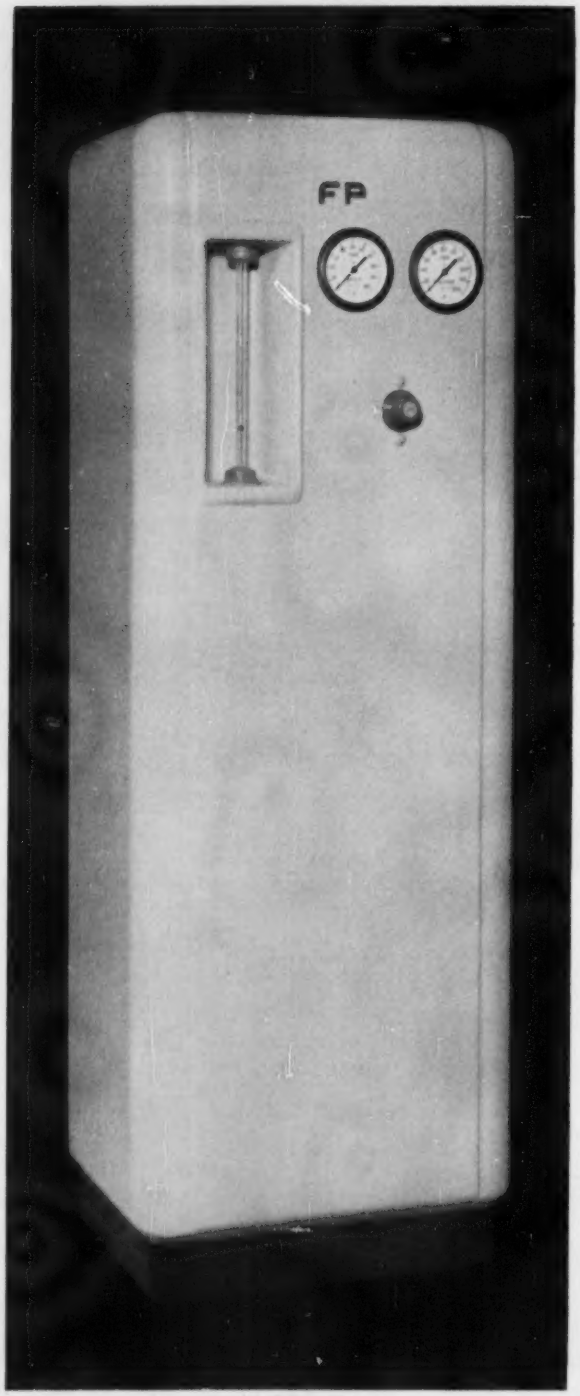
TRI-CLOVER

Export Dept.
8 So. Michigan Ave.
Chicago 3, U.S.A.

8355

FP *complete process instrumentation*

ONE Basic F&P Model 1050-A Chlorinator Offers Automatic Proportioning or 4 Other Types of Control



The Fischer & Porter Model 1050-A Automatic Chlorinator is designed for use wherever chlorine feed rate automatically proportioned to main line water flow rate is required. The automatic proportioning device is designed to respond to the flow rate signal of primary measuring elements: differential pressure, open-channel or rotating meters. These signals may be any standard form of transmission.

Like the manual chlorinator, it is simple in design, corrosion resistant, easy to install, low in maintenance cost, and has a Fiberglas* cabinet. In addition, four other types of control are available in the same basic unit: Remote Set, Start-Stop, Multiple Rate (pump sequence), and manual control.

Highlights of the F&P Automatic Proportioning Chlorinator

- All parts for manual and automatic chlorinators are interchangeable
- Any standard type of transmission may be utilized—vacuum, pneumatic, electrical
- Complete vacuum system, independent of the power-operation of the system—not affected by power failure
- Automatic proportioning with accuracy well within 4% is available over a wide range
- Simple conversion in a matter of minutes from automatic to manual operation

Fischer & Porter offers a wide variety of chlorinators for municipal water and sewerage systems, industrial plants, swimming pools. See your local F&P representative or write for free literature.

*Trade Mark OCF Corp.

FISCHER & PORTER COMPANY

COUNTY LINE ROAD • HATBORO 11, PA.

Measuring, recording and controlling instruments
Centralized control systems
Data reduction and automation systems
Chlorination equipment
Industrial glass products

Sales offices in 32 American cities and in principal cities abroad

Season's Greetings!
P. Val. Kolb, President
Robert S. Whiteside
Vice-President
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Asst. Sales Mgr.
R. Steele Sherratt
New York
Sylvester A. Ryan
Asst. Sales Mgr.
Michael Padley
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Louis Petta
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J. D. Stone
(Consultant)
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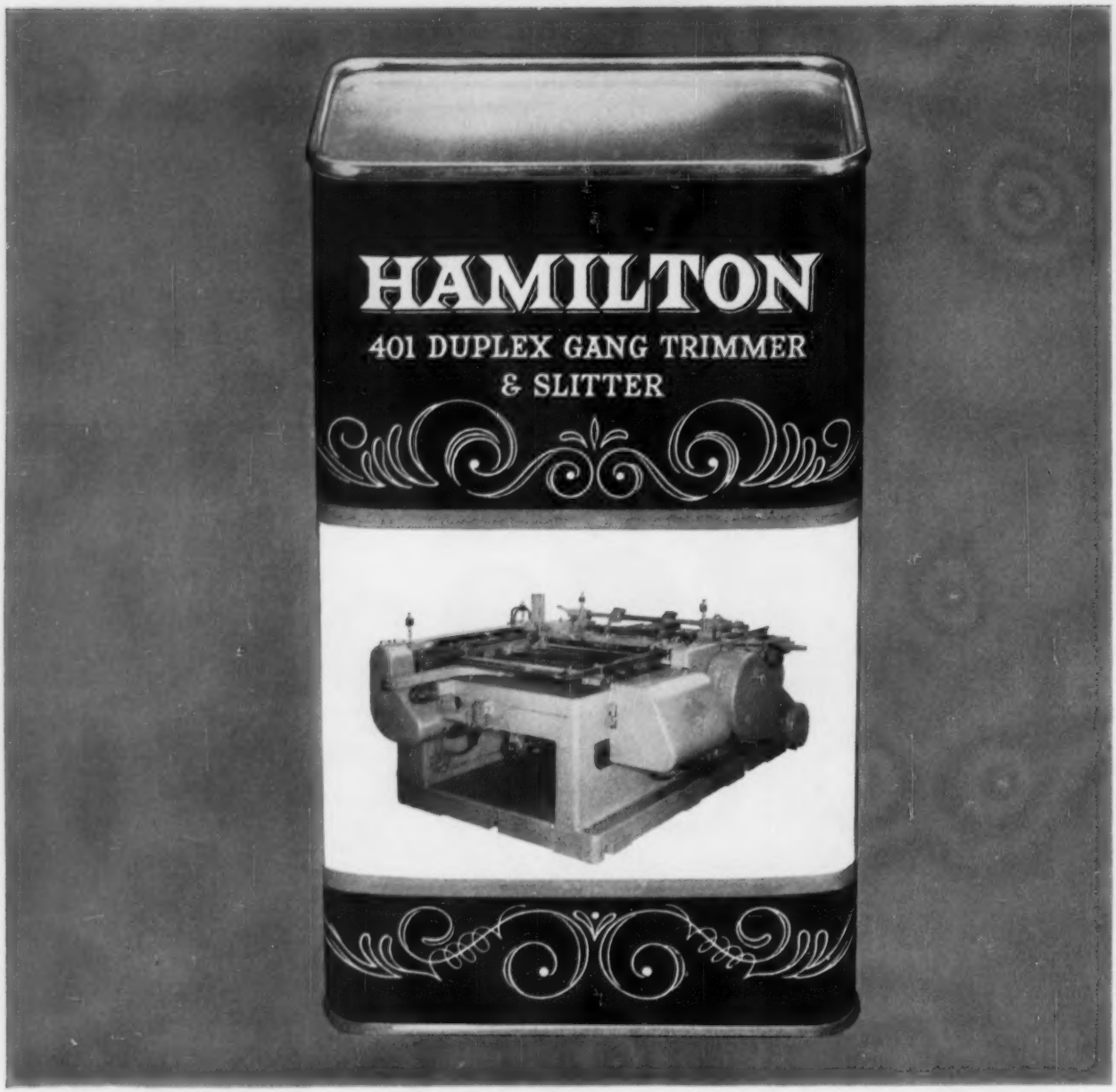
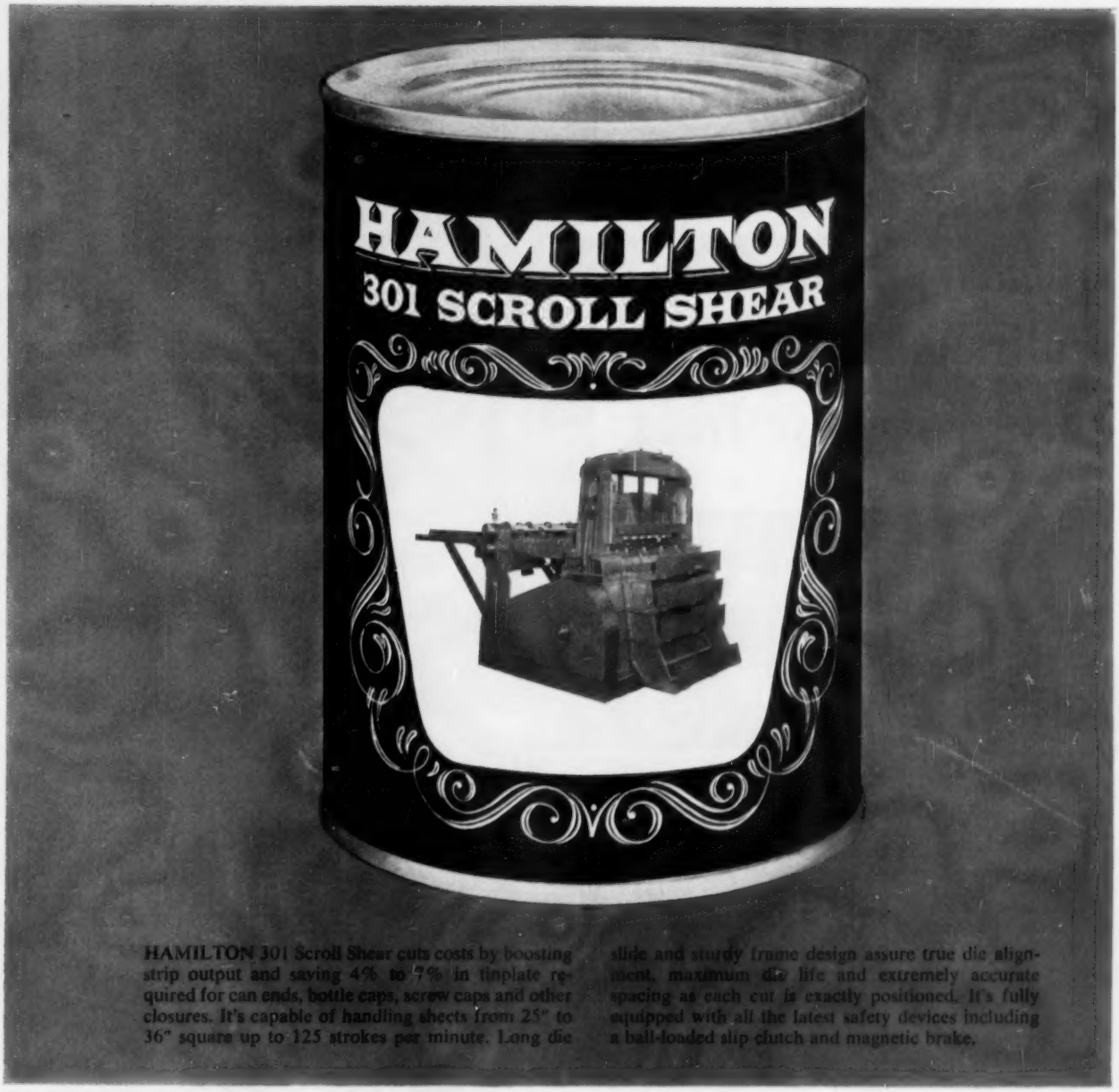
Kansas City
D. L. Nunn
Kansas City
W. Quincy Isaacs
Kansas City
Jim Doty
(Consultant)
Kansas City
To all our friends, our sincere wishes for a very Merry Christmas and a Happy and Prosperous New Year.
President
Sterwin Chemicals Inc.
Subsidiary of Sterling Drug Inc.
1450 Broadway, New York 18, N. Y.
IN CANADA:
Sterwin Chemicals Of Canada Ltd.
1019 Elliott Street W., Windsor, Ont.



proven cost-cutters

HAMILTON 401 Duplex Gang Trimmer and Slitter is about 40% faster than other new slitters, easily meets the need for higher production rates. Its streamlined, simplified design provides maximum accessibility and easy adjustments. Both units mounted solidly on a massive, heavily reinforced base prevent distortion and misalignment. Greater accuracy is assured by its ruggedness and precise gauging. It exactly duplicates litho press gauges. It'll cut your rejects, improve your product quality.



HAMILTON 301 Scroll Shear cuts costs by boosting strip output and saving 4% to 7% in tinplate required for can ends, bottle caps, screw caps and other closures. It's capable of handling sheets from 25" to 36" square up to 125 strokes per minute. Long die slide and sturdy frame design assure true die alignment, maximum die life and extremely accurate spacing as each cut is exactly positioned. It's fully equipped with all the latest safety devices including a ball-loaded slip clutch and magnetic brake.

for can-makers . . . .

It will pay you to check these two automatic, high-speed machines and others in Hamilton's complete line of can-making machinery. Why not write today for details on revolutionary Hamilton equipment that can cut drastically the cost of every step in your can-making line. Address: Hamilton Division, Baldwin-Lima-Hamilton Corporation, Hamilton, Ohio.

BALDWIN BLH LIMA-HAMILTON

Hamilton Division
BALDWIN-LIMA-HAMILTON

For more data, circle this page number on card at back →

Ocean Spray
cooks up more cranberry sauce profits with
Yarway Impulse Traps

"Ocean Spray", a famous name in cranberry sauce and jelly, is now using *Yarway Impulse*, a famous name in steam traps, on jacketed cooking kettles at their Bordentown, N. J. plant.

Result—greater cooking efficiency, less down-time, and a bigger batch of profits.

Look at this list of advantages found in the YARWAY Impulse Steam Trap. See if *your* trapping installations would benefit from them:

- **Quick heat-up and even temperatures of equipment**
- **Good for all pressures without change of valve or seat**
- **Small size—light weight**
- **Only one moving part**
- **Stainless steel—minimum maintenance**
- **Won't freeze up**
- **A complete line of sizes and types for every requirement**
- **Immediately available from over 270 Industrial Distributors**

Write today for free Trap Catalog and Trap Selector.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

YARWAY

IMPULSE® STEAM TRAP

OVER 1,000,000 YARWAY IMPULSE STEAM TRAPS USED

THE UNIQUENESS OF DIATOMITE FILTERAIDS

Paul W. Leppla, Technical Director

The purpose of a filteraid is to sieve out suspended solids without plugging. Therefore, it follows that the porosity of the filter cake is an important characteristic. This is one of the several properties possessed by filteraids produced from diatomite (diatomaceous earth or DE) to a remarkable degree. Actually, diatomite filteraids form filter cakes consisting largely of space, since 85-90% of the volume of the cake is void space and unlike filteraids produced from cellular materials, almost all of the void space is available or useful.

Fine powders of siliceous materials often pack into a bed in such a fashion that the percentage of voids is close to 25%. Thus, 100 pounds of silica in the form of sand occupies about one cubic foot and provides 0.25 cubic foot void space.

In contrast, 100 pounds of processed diatomite filteraid develops over five cubic feet of filter cake, and provides about 4.5 cubic feet of void space for filterable solids. Diatomite filteraids thus offer 18 times the solids retention capacity of an equal weight of sand.

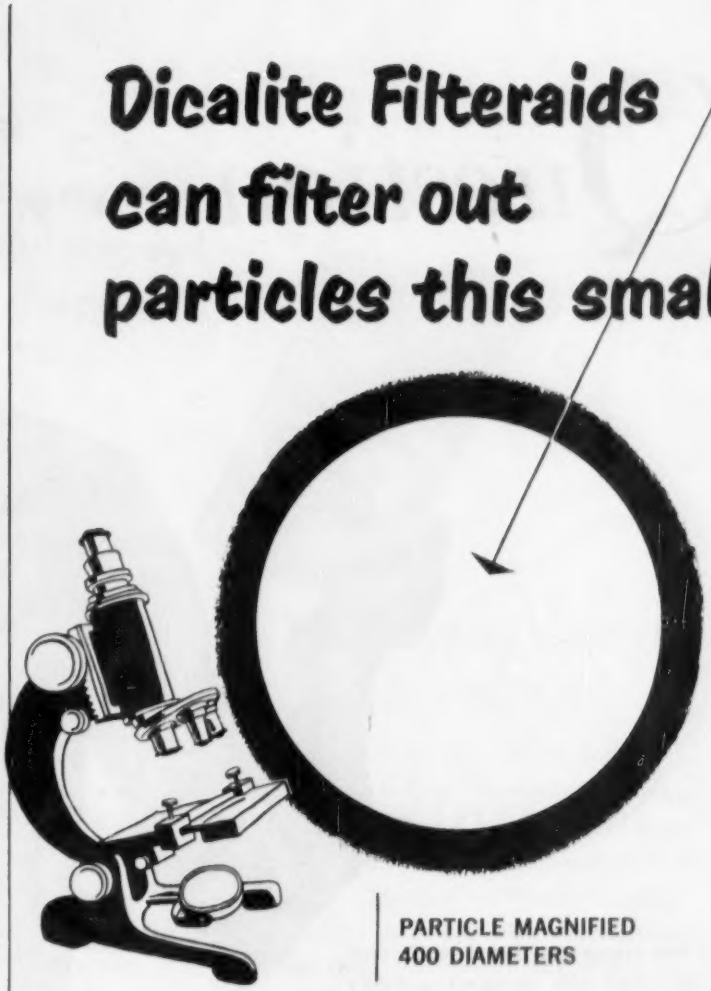
Let's calculate the theoretical filtration capacity of the two materials, using the assumption that filtration will proceed until the voids are completely plugged. Actually, this ideal case is never achieved, but the comparison between the two materials will still be valid.

If the liquid to be filtered contains 1% suspended solids by volume, the sand bed will filter 188 gallons before the void space is completely filled. The same weight of diatomite filteraid will filter 3,400 gallons on the same basis.

As a first approximation, or filteraid rule-of-thumb, the filtration engineer, lacking actual test data, will recommend the addition of diatomite filteraid at the same percentage as that of the suspended matter to be removed. On this basis, it is seen that the hypothetical liquor containing 1% matter as described above should require 1% filteraid. Our calculation shows 100 lbs. diatomite to 3,400 gallons of filtrate, or 0.37%. In plant practice, filteraid dosage often is well below the rule-of-thumb recommendation. This provides convincing evidence for the statement that nearly all the void volume in diatomite filter cakes is available or useful.

From time to time in the past, materials other than diatomite have been introduced as filteraids, often on the mistaken basis that low bulk density is the principal property required for success. The list of materials upon which ambitious plans have been made and have failed is long. A few filteraid adjuncts having special properties find limited utility in the process industries, but diatomite continues to be the outstanding raw material for filteraid manufacture.

Dicalite Filteraids can filter out particles this small!



PARTICLE MAGNIFIED 400 DIAMETERS

That's right—you can't see it, even when magnified 400 times. The eye can detect, at 10″ distance, a particle 80 microns in size; hence, we're talking about particles smaller than .2 micron, down below the wave-length of visible light.

And Dicalite Filteraids are trapping and filtering out smaller particles than that, particles as small as .137 micron, particles visible only with the ultramicroscope or the electron microscope. Which explains why Dicalite Filteraids are so widely used in so many processes where thorough separation is imperative for purity and clarity. Write for further information.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DIVISION • GREAT LAKES CARBON CORPORATION, 612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA

Question . . .

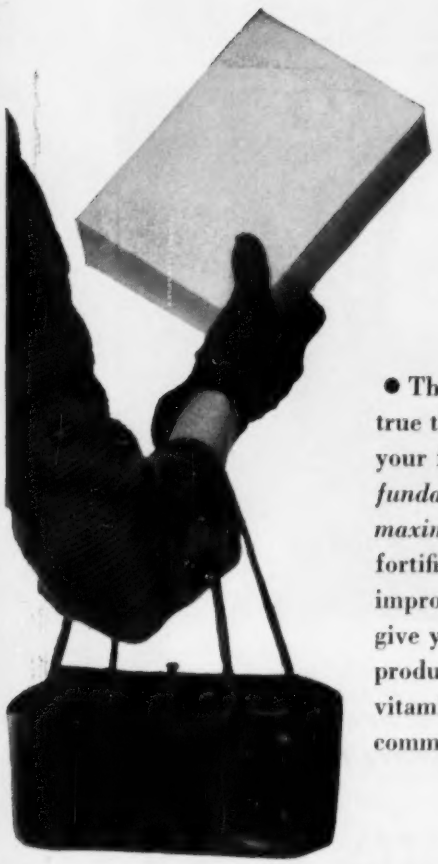
Three of the many groups of foods and beverages that are increasing sales with Pfizer vitamin fortification and enrichment:

● You can give carbonated beverages health appeal for just a fraction of a cent per bottle. That's all Pfizer vitamin-fortification costs. Bottlers are already using Vitamins B_1 and C to boost sales to today's vitamin-conscious public. Vitamin B_{12}, a factor in child growth, is also being considered.

● It's a smart sales move to enrich flour, macaroni, corn meal and similar products with Pfizer BI-CAP® enrichment concentrates. They give such products more food value. Let Pfizer show you how BI-CAP can add sales appeal to your product.

● To fortify your sales position in the canned juice, concentrate and fruit "ade" market, fortify these products with Pfizer vitamins. "Vitamin Fortified" on your label is a strong sales inducement. What's more, your vitamin content is standardized to offset processing losses and seasonal variations.

What's the most powerful appeal to the food shopper?



Answer . . . Her family's health!

Here's how to put it in and on your package.

● There's something very basic about the grocery business that's so simple and true that it's often overlooked. More vital to the *permanent sales position* of your food product than all the temporary give-away promotions is *the fundamental desire of every homemaker to provide her family with the maximum in health-giving nourishment.* That's why Pfizer's vitamin fortification and enrichment program fits in so well with any contemplated improvements in your product. Your Pfizer sales representative is prepared to give you full details on how Pfizer vitamins can powerfully increase your product's sales potential. Remember that Pfizer has been a major vitamin research and production center since the first vitamin was commercially produced.

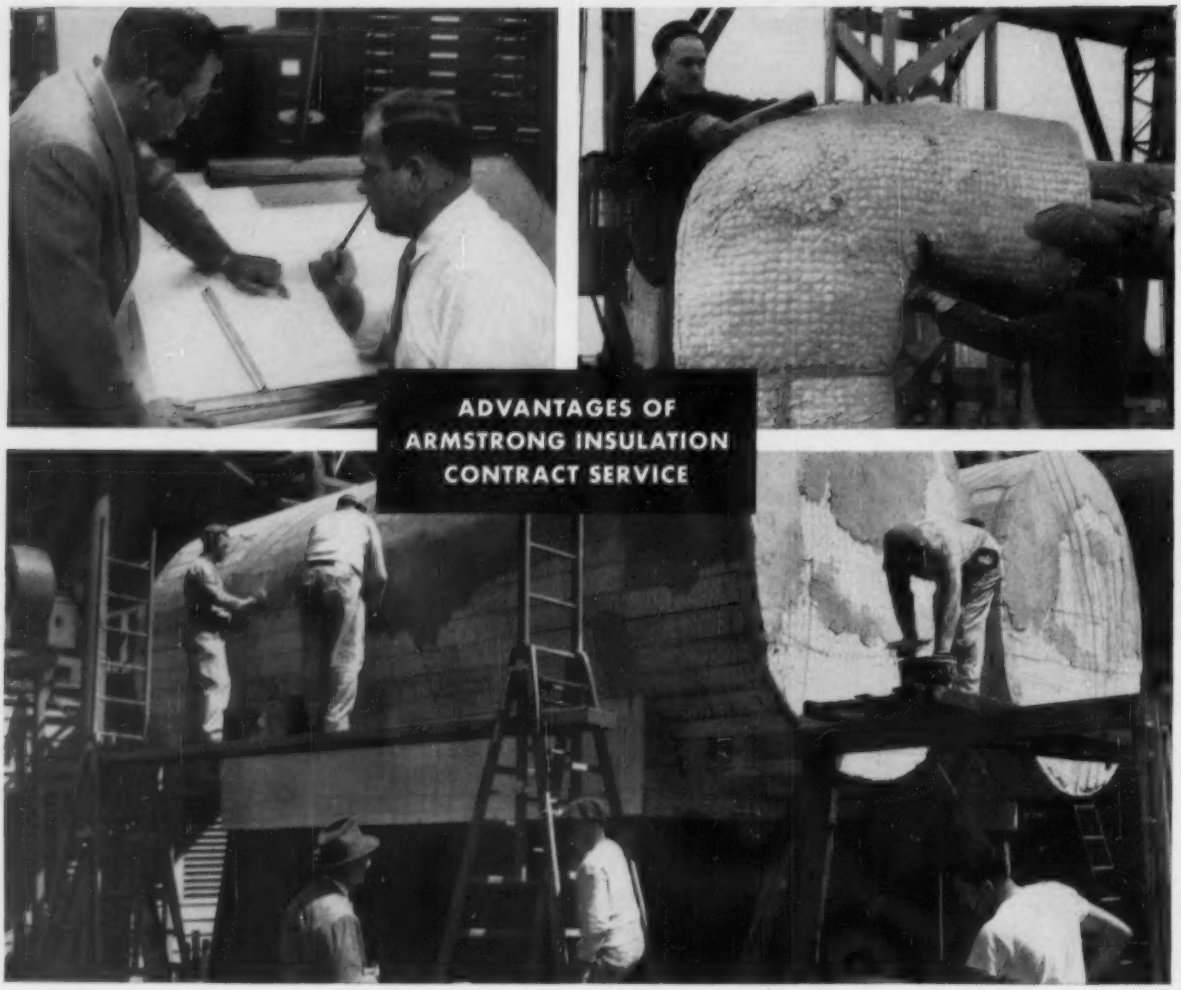
Manufacturing Chemists for Over 100 Years **Pfizer**

CHAS. PFIZER & CO., INC.

Chemical Sales Division

630 Flushing Ave., Brooklyn 6, N. Y.

Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.



ON-THE-JOB SUPERVISION . . . *trained people oversee your job from start to finish*

A good way to avoid delays on a construction project is to plan the job carefully—then provide the type of supervision that will make the plan work. Armstrong makes every effort to execute insulation contracts that way.

When you buy insulation work from Armstrong, the sales engineer is your contact with the Armstrong organization. He remains your contact until the job is completed to your satisfaction. Working with him is a construction superintendent who arranges material deliveries and labor schedules. Installation is by skilled mechanics under the supervision of a trained foreman.

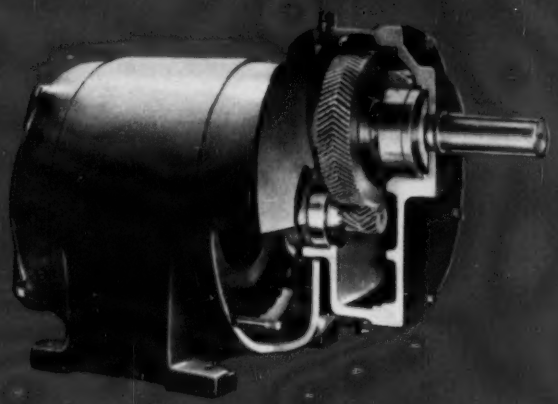
No matter where your next insulation job may be, you can depend on Armstrong's ability to perform. A nation-wide network of 42 offices provides a full line of high- and low-temperature insulations, as well as the technical assistance of qualified engineers. The facilities of the Armstrong Research and Development Center are also available to help with special problems.

Get full details on the many advantages Armstrong's Insulation Contract Service offers you by calling your local Armstrong office or writing to Armstrong Cork Company, 2012 Seventh Avenue, Lancaster, Pennsylvania.

Armstrong INDUSTRIAL INSULATIONS

Armabestos* • Armaflex* • Armaglas* • Armatemp* • Corkboard • Cork Covering • Insulcolor®

*TRADE-MARK



SINGLE REDUCTION
Parallel Shaft Type

MASTER
-1st Choice
for GEARMOTORS

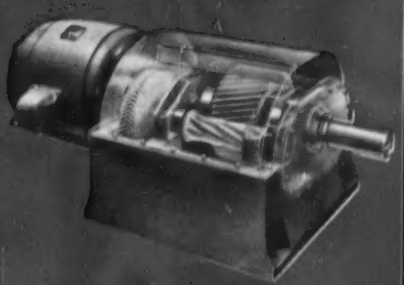
Because...

...With five types of parallel and right angle Gearmotors, Master has the flexibility and choice of design you need for selected output speeds.

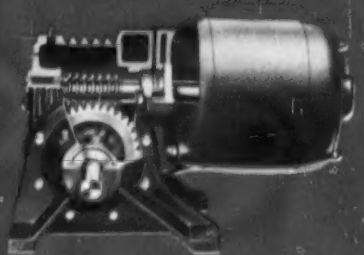
...With electric motor and gears combined into a compact, integral power unit, you reduce costs and increase efficiency through elimination of belts, couplings, chains, sprockets, external bearings or separate reducers.

...Available in sizes from 1/8 to 125 H.P. You can integrate with the gearmotor electric brakes—3 types of variable speed units and fluid drive in any combination.

...And that's why more gearmotors carry the Master name than all other makes combined. Write on your business letterhead for details.



DOUBLE REDUCTION
Parallel Shaft Type



SINGLE REDUCTION
Right Angle Shaft Type

THE MASTER ELECTRIC COMPANY
Dayton 1, Ohio

AUTHENTICATED · CASE HISTORY · From the Current Files of Hoerner Boxes, Inc.

Re: The Mathes Company, Fort Worth, Texas

Costs cut 27c per unit through improved packaging*

In 1953, The Mathes Company of Ft. Worth expanded their manufacturing operation from furniture, fans and coolers to refrigerated room coolers. They shipped their room coolers in 5-piece plywood boxes — costs and damage claims ran high.

Finally Mathes called in a Hoerner Packaging Engineer. He designed a corrugated box, put it through trial runs and compression tests, re-designed. In February, 1954, the Hoerner container went to work.

The Hoerner design cut 27c per unit from the cost of the shipping containers. This will save the Mathes Company $22,000 in 1955 alone. What's more, the new Hoerner container reduced shipping weight by 6¾ pounds, saving Mathes considerable freight costs — and damage claims have been practically eliminated.

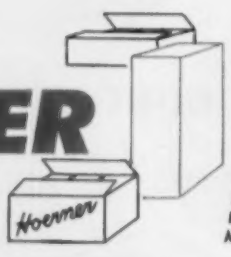
Switching from rough plywood to a printed corrugated box added attractive name identification and promotion value to The Mathes Company shipping containers.

*The Hoerner Packaging Engineer responsible: H. L. Gannett

HOW A HOERNER PACKAGING ENGINEER CAN HELP YOU!

If your company packages things, whatever they are, why not ask us to have a Hoerner Packaging Engineer come in and make an objective study of your packaging operation. It won't cost you a cent or obligate you in any way. It can mean an increased margin of profit through savings in labor and material costs and prevention of shipping losses. Just write to one of the Hoerner plants listed below.

Packaging Engineers—Designers and manufacturers of corrugated boxes.



SALES OFFICES
209 S. LaSalle St., Chicago 4 • 50 E. 42nd St., New York 17
328 Park Ave., Urbana, Ohio • 2826 Main St., Kansas City, Mo.

HOERNER BOXES, INC.

GENERAL OFFICES
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PLANTS
Keokuk, Des Moines and Ottumwa, Iowa • Sand Springs, Oklahoma
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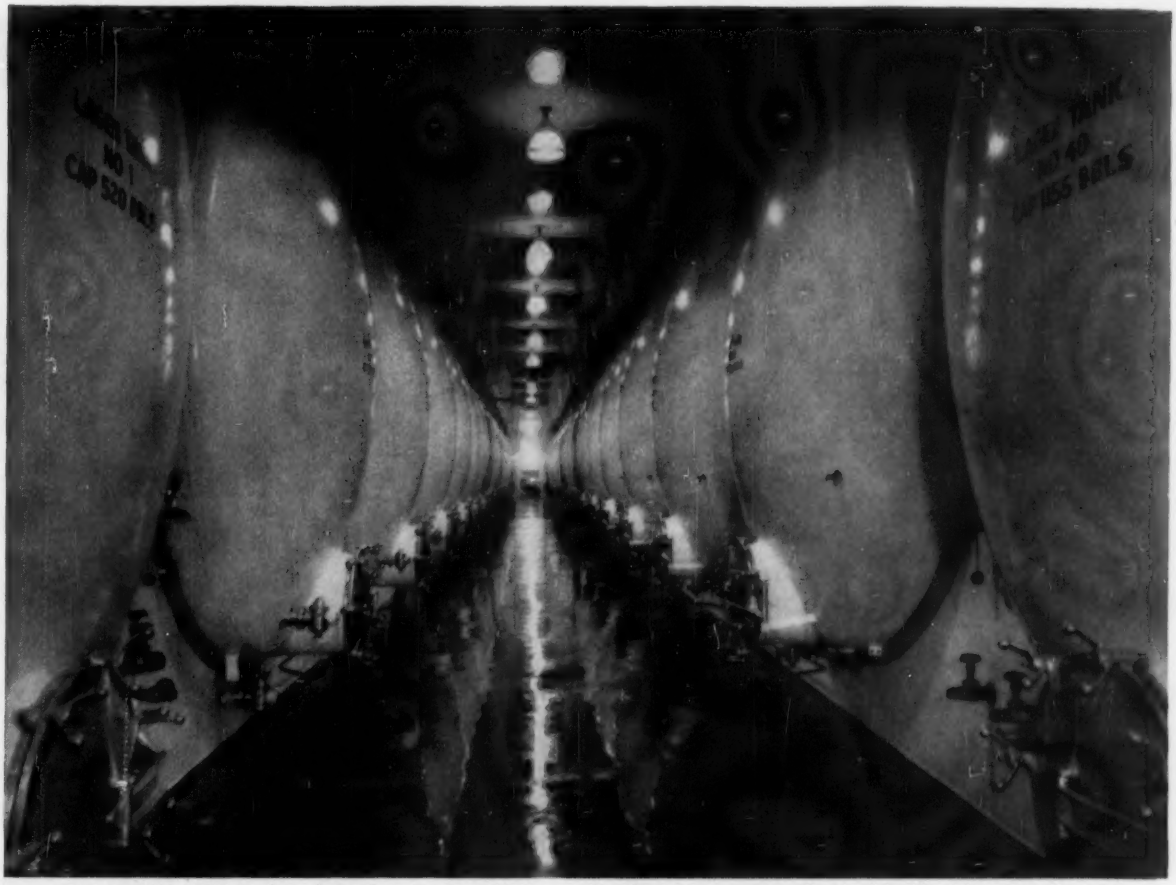
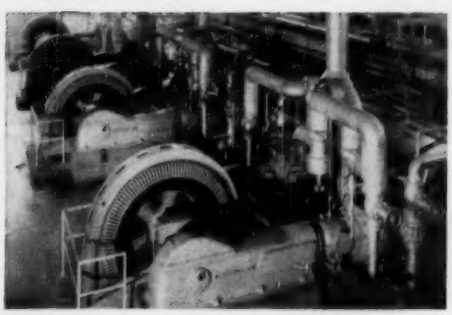


IN LAGERING CELLARS, beer is aged under controlled, near-freezing temperatures maintained by Worthington equipment.

Worthington keeps beer cold, employees cool at new Budweiser plant



RELIABLE REFRIGERATION for the "King of Beers" is provided by these four Worthington compressors, which supply a total of 1660 tons of refrigeration.

ABOUT THE BEER . . . critical stage in beer-making is the ageing or lagering of the brew.

At the new Anheuser-Busch plant in Los Angeles, Worthington refrigeration equipment is keeping a rigid check on the temperature inside the lagering tanks. It's here under constant, cold temperature that the distinctive flavor of Budweiser comes of age.

ABOUT THE EMPLOYEES . . . Worthington compressors also provide comfortably cool air conditioning for the brewery's offices, dining room, bottling shop and administration building. Budweiser management figured that a comfortable shop is a happy, efficient shop . . . and high annual production with little personnel turnover proves they were right.

SOLVING TOUGH REFRIGERATION PROBLEMS is a daily matter at Worthington. We'd like to focus on yours. Write us today. Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.5.62-FE, Harrison, N.J.

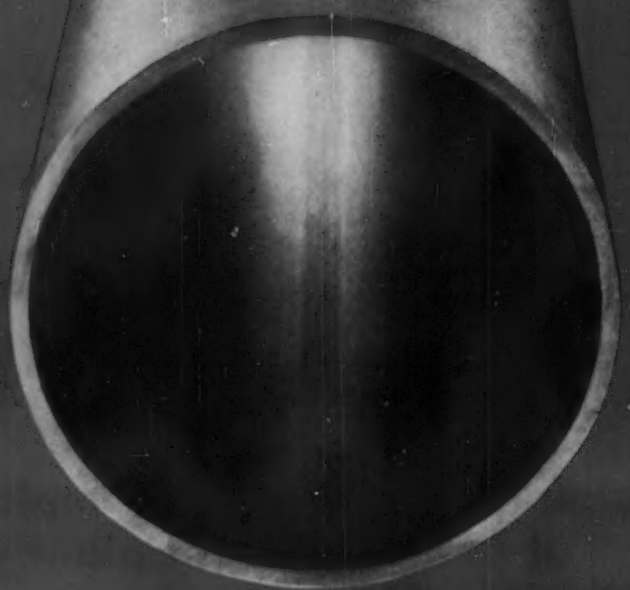
A.5.62

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME

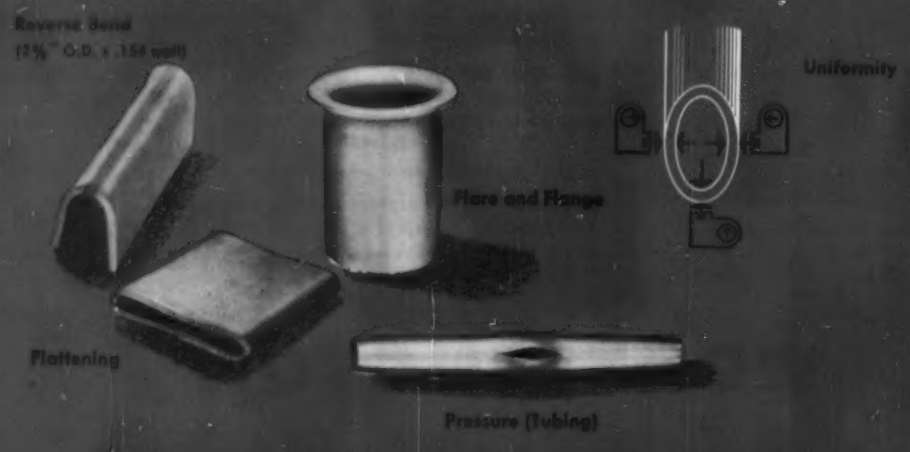
For more data, circle this page number on card at back →

NOW no bead,



Photograph of Contour-Welded 3" IPS Schedule 10 pipe Type 304

CONTOUR-WELD PIPE...BEST BY ANY TEST YOU CAN NAME



no undercut

in new type welded stainless steel pipe

Now, TRENTWELD is better than ever! Thanks to Trent's new patented *Contour-Weld** process, you can now get stainless pipe or tubing that's really smooth inside . . . free from any undercut or projecting weld bead.

Check these Benefits

As before, this new-type TRENTWELD is made from uniformly rolled stainless strip. That's why you'll always get extremely high uniformity both of wall thickness and curvature. And Trent's new *Contour-Welding* brings that same uniformity to the weld zone itself. This means a stronger pipe or tube with smoother flanged or flared ends . . . no cavitation corrosion or erosion . . . better performance in every category than with any other, welded or not.

Try new Trent *Contour-Welded* pipe or tubing for yourself. It's a natural for pressure lines . . . lines carrying corrosive chemicals . . . high-velocity systems. And remember, it's made by Trent — tube-mill specialists.

Why Trent's Exclusive *Contour-Weld* Process Means Smoother Welds . . .

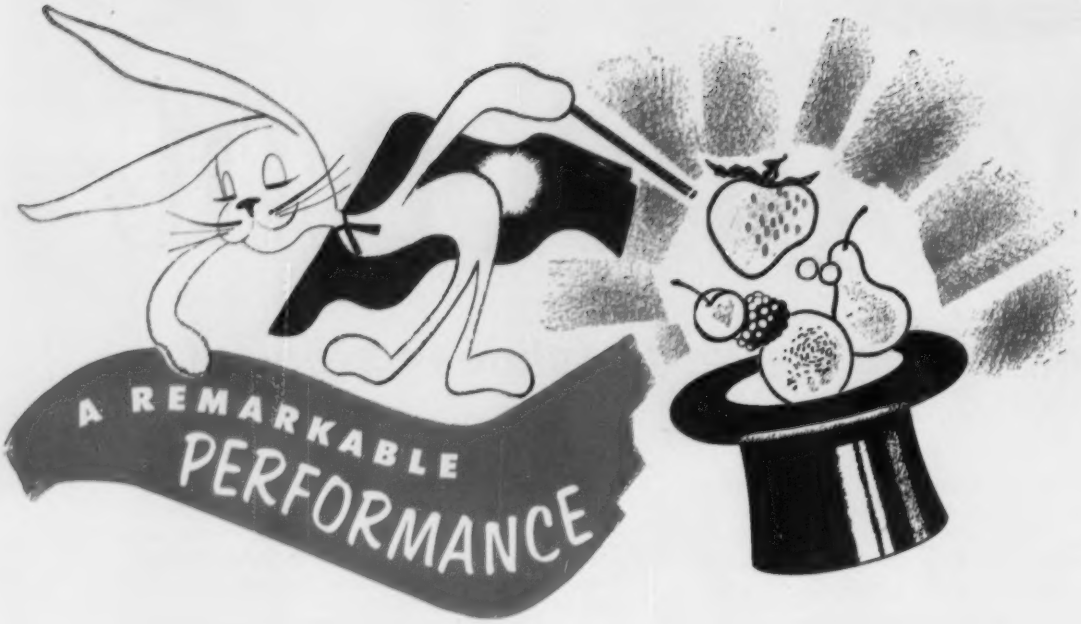
With conventional welding, gravity means beads . . . or undercut, particularly in heavy sections. Gravity pulls some of the molten metal down into the pipe to form a bead that is extremely difficult to remove by cold working. And cold working of the inside bead can lead to undercuts, focal points for erosive and corrosive attack. Cleaning becomes difficult.

With new Contour-Welding, gravity means smoothness. Trent's new *Contour-Welding* puts gravity to work. The pipe is inverted, and welded at the bottom. Gravity still pulls the molten metal down — but that simply makes the weld-bead contour correspond to the contour of the pipe itself. That's why there's no tell-tale bulge of weld metal on the critical inside surface. And even on the outside, the weld bead more closely approaches that of the parent metal than other welded pipe.

Contour-Weld is the trade mark of the Trent Tube Co. for its process of welding pipe and tubing which is protected under U.S. Patent 2,716,692.

TRENTWELD **STAINLESS STEEL TUBING**

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN (Subsidiary of CRUCIBLE STEEL COMPANY OF AMERICA)



★ The SEALVA process hermetically seals flavors, even those with the most fugitive and delicate components, against the deteriorating effects of aging and oxidation. Droplets of liquid flavor are completely sealed in an inert, edible gum film forming a dry powder. The completely protected flavor is released only in the mouth or in water.

SEALVA flavors have been enthusiastically accepted in almost every branch of the flavored goods field.

In GELATIN DESSERTS, far superior flavor quality is possible without regard to aging. In CONFECTIONS of the pressed type, flavor permanence is assured. In MIXES and DESSERTS, problems of oxidation and evaporation no longer exist. As DAIRY MIXES, SEALVA flavors offer unbelievable possibilities. In PHARMACEUTICALS, SEALVA flavors find their widest acceptance.

Wherever permanent flavor perfection is desired in dry form, SEALVA is the answer.

Tell us your product, your problem. Send for samples and literature.

VAN AMERINGEN-HAEBLER, INC.
521 West 57th Street, New York 19, N. Y.

★ Alva FLAVORS

KEY QUERIES getting to the heart of grievance arbitration were posed by FE Associate Editor Ivan C. Miller (left). And the answers—spotlighted here—were provided by nationally-known arbitrator and industrial relations educator, Jules J. Justin (center), and American Arbitration Assn.'s executive vice-president, J. Noble Braden (right).

Experts Give You Practical Answers on

Arbitrating Grievances

FOOD ENGINEERING puts pointed questions directly to top-rung authorities on arbitration—who reveal the working details of this most effective method for settling management-labor disputes

PART I OF A TIMELY SERIES

IVAN C. MILLER
Associate Editor, "Food Engineering"

INTO MOST management-labor contracts there now goes a clause requiring final settlement by arbitration of any difficulties between the parties that are not otherwise resolved.

But though such arbitration of grievance disputes has, today, won almost unanimous acceptance by both managements and unions, nevertheless not all managements, nor all unions, for that matter, fully realize the functions fulfilled by arbitration or understand how best to employ this way out of tangles.

Further, there are many who are not aware of the limitations of arbitration and hence do not know when to avoid its use.

So, to get the most practical and propitious answers to major questions about grievance arbitration, FE interviewed J. Noble Braden, executive vice-president of the American Arbitration Assn., and Jules J. Justin, leading arbitrator and director of the Industrial Relations Workshop at New York University.

Here are FE's questions and the answers by these experts—

Most Common Errors

Q—What in your opinion are the most common errors managements make in presenting their cases before arbitrators?

A (by Mr. B.)—Up until the last few years I considered the principal difficulty was lack of thorough preparation, rooted mainly in failure to examine the records.

Too often, it's apparent at hearings that management has failed to refer to the terms of the contract and even failed to bring to the hearings the personnel records.

Such reference is very important, since sometimes cases

MR. BRADEN: "The arbitrator aids by searching out all the facts."

"He endeavors to insure 'equal justice' within the plant group."

"It's all voluntary. So the parties engaged control the procedure."

are decided on a clause of the contract that is not brought out in the original grievance procedure at all.

Also, management frequently fails to interview witnesses to the incident thus to determine exactly what occurred. Another oversight has been that management too often has not determined whether the discipline meted out is on a par with that which has been given other offenders, or whether it should be.

Here are some suggestions for management: Avoid overemphasis and exaggeration in the presentation. Place no reliance on a maximum of argument that's backed by a minimum of facts–for argument without fact is unpersuasive. Withholding essential facts, distorting the truth, or resorting to torturing of the facts weaken management's case.

Also troubling is the lack of supporting evidence, such as documents and records. And equally unfortunate is the unwillingness to produce them.

In point is this reminder: Results of many grievance arbitration cases–and contract arbitration cases, too, for that matter–firmly establish that many records considered by management as private and confidential actually are not, since often such "company secrets" are submitted by the unions as testimony.

And furthermore, it is a faulty, and costly, tactic when management endeavors to place a lay arbitrator at a disadvantage by the introduction of legal technicalities. In truth, however, this approach is seldom made by the company's own industrial relations personnel. Rather, it is usually attempted by outside counsel.

Comment by Mr. J.–In my experience, grievance handling has been improved as management has improved its training of supervisors in the technique of collective bargaining.

When line managements know how to handle employees, then they command respect and merit the prestige of supervising–and as a result get out the production.

Arbitrator's Helping Hand

Q—May a party who gives a faulty presentation nevertheless win because deficiencies are compensated for by the arbitrator's ability?

A (by Mr. B.)–It goes even deeper than that, since the arbitrator must justify his conscience in making a decision. Therefore, in good conscience it is necessary for him to find, and bring out, all the facts.

In the courts, the jury's verdict is based on the evidence presented. And the arbitrator is under oath to render equity. Therefore, when a party has inadequately prepared, or inadequately presented, the case, the arbitrator will aid by searching out all the facts by questions asked.

Extra Check-Ups

Q—Then arbitrators don't render their awards exclusively on data presented to them, and so we ask: Are they expected to use any independent investigations as the basis for a decision?

A (by Mr. B.)—Under our rules, an arbitrator must give notice to the parties and thus provide a chance for them to be present at any independent investigations. Also, he must provide the opportunity for the parties to examine and controvert his findings.

Amount of Proof Needed

Q—Management people often feel arbitrators require an extraordinary amount of proof before they find "just cause." Is this due to specific standards of procedure?

A (by Mr. J.)–Yes, there are three basic standards that arbitrators follow in determining 'just cause'–the same standards as apply in our community and civic life:

Close Look at Arbitration

Very frequently arbitration is confused with conciliation and mediation. And sometimes it is referred to as a part of collective bargaining.

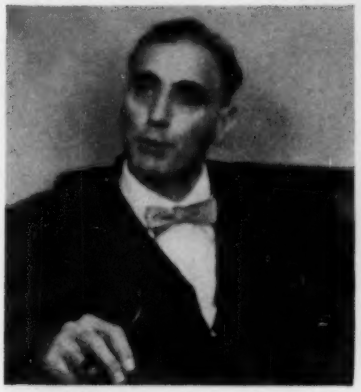
Actually, however, it is not conciliation, mediation or compromise, nor is it collective bargaining.

Arbitration is the reference of a dispute by voluntary agreement of the parties to an impartial person for determination on the basis of evidence and argument presented by such parties, who agree in advance to accept the decision of the arbitrator as final and binding.

It is a judicial process, and the arbitrator is, in fact, a judge. Parties present their evidence, witnesses, or documents, and each is permitted to cross-examine the evidence of the other.

Upon the evidence submitted by the parties and the arguments advanced by them, the arbitrator makes his decision.

The parties, having voluntarily agreed to arbitrate, are bound to accept and carry out the decision.—*American Arbitration Assn.*



MR. JUSTIN: "We follow basic principles in determining 'just cause.'"

"First, did the employee do it? Second, was punishment necessary?"

"You benefit by viewing discipline as 'correction for improvement.'"

First, did the employee commit the specific offense or breach of rule—a question of fact the arbitrator must determine before continuing to the next question, which is: *Was punishment necessary in this particular case?*

In the industrial work unit, as in the community or civic areas (and sometimes even in our own homes), rules are promulgated and observed more in the breach than in the enforcement.

Some sections of management do not go along with the third standard, which is: *Was the punishment imposed appropriate to the offense?*

Again, the counterpart or precedent is found in our civic community: If a man is found guilty of a breach of an ordinance or rule, the judge (trier of the facts) has a right to consider the degree of penalty.

Comment by Mr. B.—An added standard is *'equal justice under the law'*; for arbitrators must frequently face the fact that application of the rules isn't always equal throughout the plant—that exceptions are made. And sometimes, through favoritism or lack of desire to exercise what may be called 'prerogative of management', certain rulings are waived. Then subsequently, the foreman or a department head suddenly 'clamps down'.

Penalties for breaches are not uniform throughout industry, and they need not be. However, the arbitrator must endeavor to insure 'equal justice' within the plant group or unit.

Discipline Cut Back?

Q—Haven't collective bargaining and arbitration narrowed management's authority in administering discipline? Under a union contract it seems that about all a company can do is reprimand, order disciplinary suspension, or discharge the employee. Are there others forms of discipline an arbitrator would uphold?

A (by Mr. J.)—A large portion of the workers in industry are represented by unions and over 90% of all U. S. companies and unions use arbitration.

However, in themselves, these facts *do not restrict management's right to maintain discipline in its plants.* Though a company has no union, nevertheless certain policies are necessary for handling the non-unionized force.

Principles of discipline that a company should apply in a non-organized plant are the same principles they would apply under the contract standard of 'just cause.'

Though some contracts allow management to impose such disciplinary measures as denial of seniority and certain holidays, it is to management's benefit, in my opinion, that discipline be viewed as 'correction for improvement.'

The best kind of discipline avoids taking away wages, benefits, or coveted privileges. To correct the employee, give him a written reprimand or disciplinary suspension strongly indicating to him that he's on uncertain ground for continued employment.

Parallel With No-Strike Clause

Q—Since arbitration is thought of as an alternative to strikes, does that mean the contract's arbitration clause should have the same scope as the no-strike clause?

A (by Mr. J.)—In my opinion, it should have. I assume your question refers to arbitration of disputes over contract interpretation, which is usual in industry. Such arbitration clauses should be co-extensive with no-strike clauses.

You may recall President Truman's 1945 conference to discuss ways of minimizing work stoppages. Here, management and labor agreed that provisions for arbitration of disputes or grievances arising out of interpretation of contracts had to cover the same ground as the no-strike clauses.

This is advantageous from management's point of view. For if the arbitration clause is not as broad as the no-strike pledge, management may have to negotiate on some disputed point in the middle of a contract term without a method of resolving the dispute.

Traits of Good Arbitrator

Q—What fundamentals make the best arbitrator?

A (by Mr. B.)—Above everything else, a successful arbitrator must be willing to listen. *And this applies throughout the whole field of argument.*

Too often, persons don't listen to statements of their adversaries because they're too concerned with figuring out the best kind of answers.

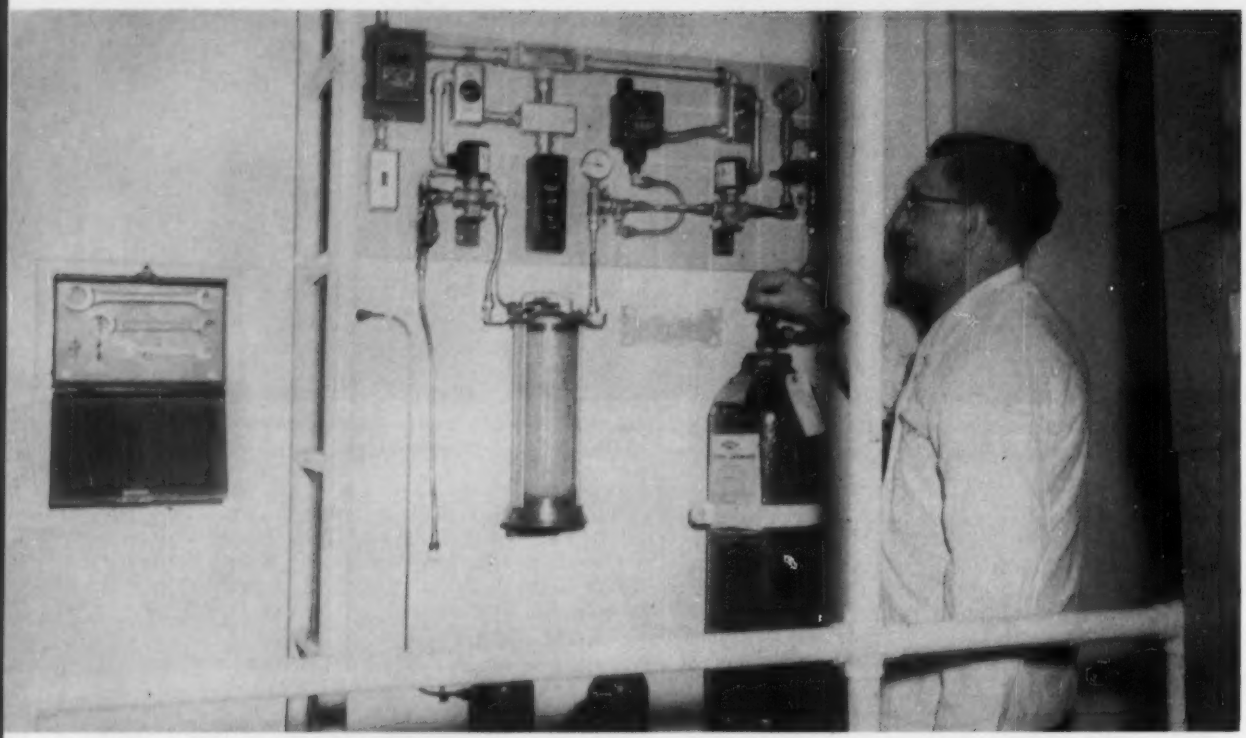
Next, after being a careful listener, an arbitrator should have some type of judicial outlook. If he doesn't have a fundamental interest in judging things then he shouldn't be an arbitrator.

The same qualifications essential in determining and

(*Turn to page 188*)

"Terminal Point"

Arbitration is the terminal point in the grievance procedure of most collective-bargaining contracts today, according to results of recent surveys, which indicate that 90 to 95% of the contracts include an arbitration clause.



THERE ARE NO ERRORS *in doses, or mishaps of leakage, now that De Mets has put in this safe, efficent system for gas-fumigating nuts in an air-tight chamber. Here, Operator Ted Annel starts the new foolproof equipment. Note protective railing. Drawing (next page) identifies the various units of system seen in this photo.*

How to Engineer *Safety* Into Your Fumigation System

Chicago confectioner does it by (1) installing special applicator that abolishes dosage guesswork. And (2) rigging ingenious arrangement of solenoids, microswitches, gas-tight valves, and filter to assure whole pecan-treating setup is leakproof

Concluding a Series of Three Articles*

MINOS J. ASPROYERAKAS
Chief Engineer, De Mets, Inc., Chicago

Two things were wrong with the way we'd been fumigating the pecans that go into the confection trade-named Turtles—De Mets' popular chocolate-coated caramel item.

First, the method was inaccurate. Second, it was hazardous.

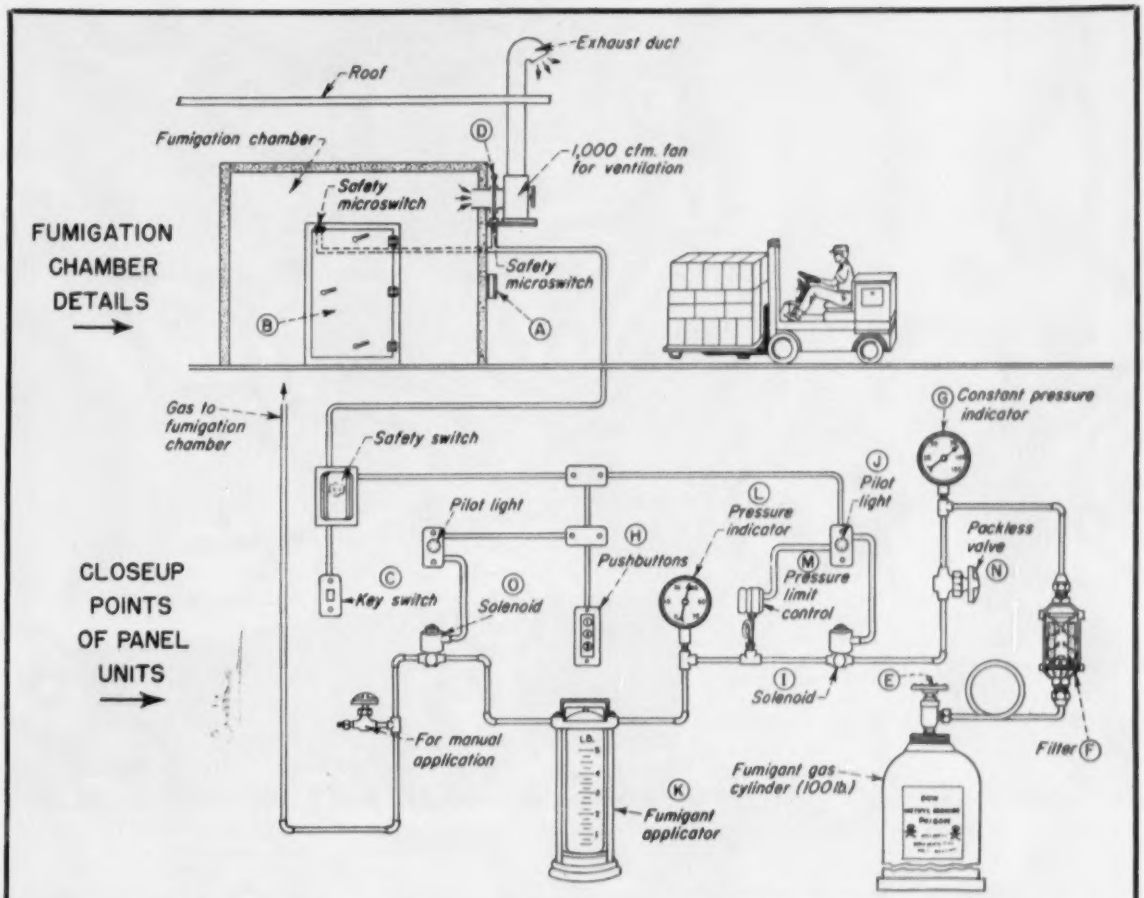
A word on the operation bears out why it was inexact: Estimated 3-lb. doses of methyl bromide were charged into the 12x12x12-ft. fumigating vault full of pecans. The gas was fed from a scale-mounted cylinder (100-lb. capacity) after manual opening of the cylinder valve. A flexible hose, attached to the cylinder valve by a reducer connection, then carried gas into the chamber. And when the pre-set scale beam tipped, the cylinder valve was manually closed to stop flow of fumigant.

And in carrying out this fumigating cycle, the operator had to exercise extreme care. Before starting, he had to make certain that vault door was locked and that the hand-operated slide-gate (between 16-in. vault duct and 1,000-cfm. exhaust fan) was closed.

As for the dangers, there was always chance of escape of some methyl bromide—which is hardly detectable by smell—through the stem of the manual valves. And some of the gas might remain in the fumigating chamber.

Moreover, there was danger of the gas cylinder tipping over and breaking the hose connecting cylinder and fumigating chamber. Too, natural wear of connecting fittings, through

* The two preceding articles were "Better Spot-Fumigation—With Only One-Third the Labor" (FE Oct., p. 62) and "20 Spots Fumigated From 1, Surer, Safer, and in One-Sixth the Time" (FE Nov., p. 64).



WORKING CYCLE: Operator first opens combination lock on key box (A), which is kept locked to prevent unqualified personnel from taking keys. Using one key, he secures three locks on fumigating chamber door (B). Second key releases electric key switch (C) that closes circuit of main line of system. And slide-gate (D) is shut to prevent gas from escaping through exhaust fan during fumigating.

In these three steps, operator has completed the electric circuit. And it is to be noted here that chamber door and slidegate must be closed securely, otherwise safety microswitches will immediately break electrical circuit, thus preventing gas flow from starting, and so precluding any escape of gas via door or gate.

Next, valve (E) on the gas cylinder (lower right) is manually opened to permit flow of the methyl bromide fumigant through valve, piping, and filter (F). Latter is type employed in refrigeration units for keeping foreign particles out of system. On indicator (G), operator now notes if gas-cylinder pressure is right. Then he presses Button No. 1, at (H), to send electric current to energize solenoid valve (I), whereupon red pilot light (J) flashes to show that this valve is open, permitting flow to system.

Methyl bromide then passes through this solenoid valve to glass-cylinder applicator (K). Gage (L) shows pressure in the applicator, and limit control (M) will close solenoid valve if pressure in glass cylinder of applicator exceeds 45 psi. Packless valve (N), between solenoid valve and filter, reduces initial pressure from gas cylinder.

Operator next checks liquid level in applicator until it reaches desired 3-lb. dose. He now presses intermediate Button No. 2 to interrupt electric current to solenoid valve (I). Then a push of Button No. 3 energizes solenoid valve (O), and a green pilot light indicates release of gas into fumigating chamber.

When glass applicator is empty, operator presses Button No. 2 to de-energize solenoid valve (O), thus shutting every connection between applicator and fumigating chamber. Then he closes electric switch and returns key to its box.

Nuts in closed chamber are contacted by the fumigant for a 12-hr. period. Gas is then exhausted from chamber for 3 hr. Finally, chamber door is opened, and nuts are taken out.

constant use, could lead to gas escape.

Called in to assist us in improving the fumigating system was Dow Chemical Co., supplier of methyl bromide. Recommended was the installation of a permanent, wall-mounted, manually operated gas applicator, hooked up to the cylinder with a rigid, tight-fitting ¼-in. copper pipe. This 5-lb. capacity glass-cylinder applicator is marked off in ¼-lb. calibrations, and it's tested to withstand a pressure up to 90 psi.

Steps to Foolproof System

Our installation of this applicator lessened the danger of the cylinder falling over and eliminated the hazard of connecting-hose breakage and leakage. Moreover, we thus got far more accurate fumigant doses.

Even so, the system was not yet foolproof. The operator still had to be careful that the fumigating-chamber door was locked and exhaust duct slide-gate closed. He also had to manually open and close cylinder and applicator valves which, through constant use, wore out and loosened the packing of the stem. So gas escaped.

Finally, however, our present dependable system was developed.

This is electrically operated (see

(Turn to page 198)

CONTROLS for sugar weighing-conveying system are located on this panel. Selector switch (A) can be set to draw sugar from any of three storage bins or from refinery. Dial (B) regulates number of 600-lb. weighings desired in run. Indicator (C) is lit, here, showing there is enough sugar in scale-hopper to start weighing. Phone keeps operator in touch with warehouse, refinery, and scale station.

Gets High-Velocity Weighing With Roboted Hub-Type System

Railroad car bulk-sugar loads are sped in and out of single-scale center. Screw and belt conveyors are paired for individual handling of extra-fine and regular grades without product damage

PAUL P. WOEHRLE
V.-p. of Development & Research
The National Sugar Refining Co., New York City.

Robot weighing . . . complete interlocking of scaling and conveying equipment . . . automatic by-pass to intermediate storage when scale is full . . . belt handling of coarse-grained product . . . screw conveying of extra-fine grained material.

These are the 'nut-shell' features of a new bulk system that rushes refined sugar at 500,000-lb.-per-shift to trucks and rail cars at National Sugar Refining Co.'s plant in Long Island City, N. Y.

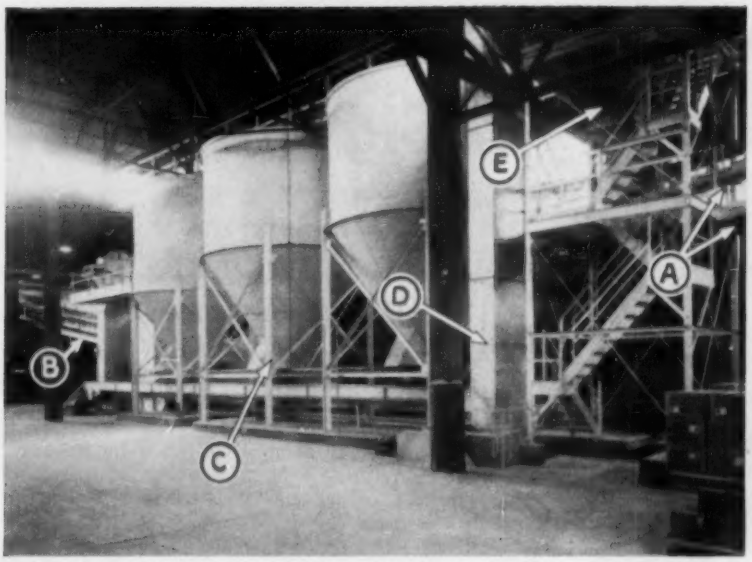
Further, the entire screw-belt conveying network is laid out so that all lines lead to the weighing station. Thus, only one 600-lb.-capacity scale is needed to handle the entire plant load.

Labor-cutting remote controls were worked out by Richardson Scale Co., Clifton, N. J., who also supplied the scale.

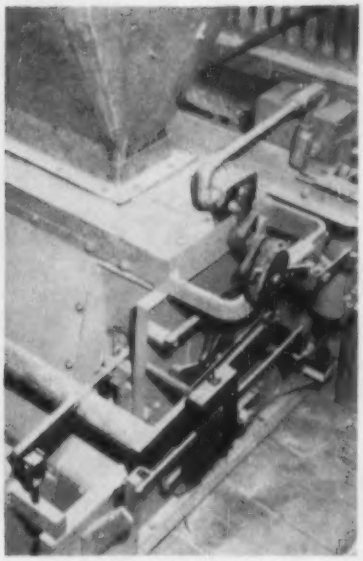
Belts, Screws Do It

From refinery storage tanks, sugar moves across a street to the warehouse on two 16-in. rubber belts (distance, 115 ft.). Here, it drops into a hopper (1500 lb. capacity).

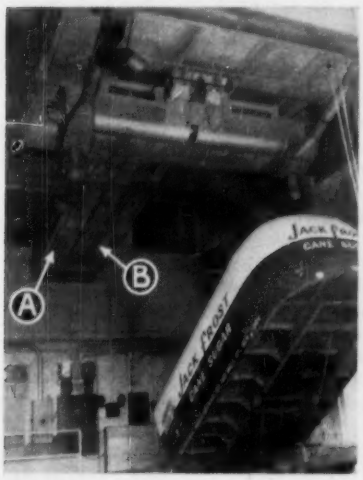
Sugar for rail cars feeds through



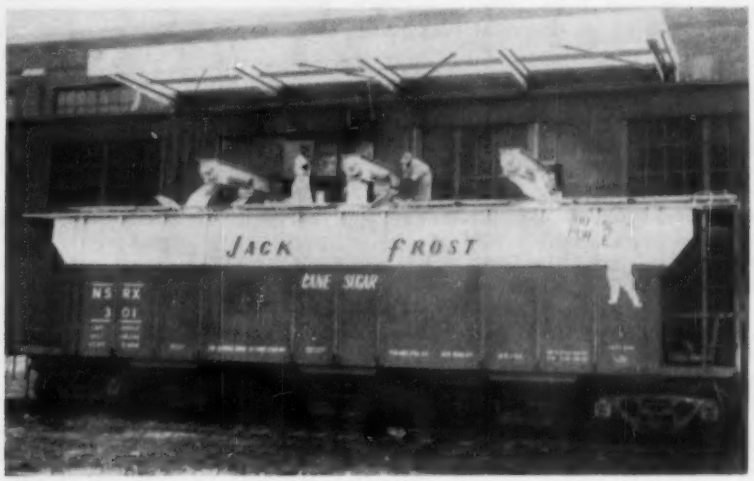
WAREHOUSE STORAGE BINS hold excess sugar from refinery. Conveyors (A) feed product to truck-loading station. Carriers (B) discharge to rail cars. "Y"-gates (as at C) open to drop bin-stored sugar either onto belt or screw conveyor (depending on grade of product). Enclosed bucket elevator (D) lifts sugar to scale. Elevated hopper (E) is positioned beneath . . .



. . . **AUTOMATIC SCALE** that handles rail car sugar flow. Operating mechanism is placed outside housing for easy access. This enables operator to check on scale accuracy.



TRUCK gets sugar from screw (A) or belt (B). Note flexible filler pipe.



RETRACTABLE screw conveyors feed sugar to rail cars. Plastic canopy (overhead) permits all-weather loading. Control panel is at center.

scale (beneath hopper) in 600-lb. batches and drops into a second bin (900 lb. capacity). Extra-fine grained product moves to the roof, then down the length of the building by screw conveyors. Coarse sugar travels by belts to avoid crystal breakage.

At this last point, sugar changes to another screw carrier that has three take-off points. At these junctions, three small screws shoot sugar into railroad car hoppers.

A similar conveyor system takes sugar product to truck loading stations located at the other building. Trucks are weighed after loading.

When top scale-hopper is full, incoming sugar from the refinery is bypassed automatically to a conveyor that feeds three storage tanks.

Just Set Dials and Push Button

Focal point of the whole system is the control board, located at the car loading station.

To start things rolling, operator (1) sets stop control for desired number of weighings; (2) selects feed source, either from one of storage tanks or from refinery; (3) checks to be sure system is cleaned out; (4) arranges retractable screw conveyor over car hopper; (5) turns main control to 'on' and (6) presses starting button.

System is interlocked so that different grades of sugar cannot be mixed. Thus, if operator decides to run fine sugar, the 'Y' gate at bottom of storage bin will open only to the screw conveyor, not the belt. All other screw conveyors on this line are then activated at the same time.

In event of an equipment breakdown, an additional safeguarding device shuts down the whole network automatically.

Conveyors and weigher turn themselves off after the pre-determined number of scalings have been completed.

Big Strides of

Health Is Spur . . . Kinds, Formulas, Methods Cited . . . Control of Contents and Labeling . . . Special Problems . . . Future Gaged

Desserts, Drinks, Dressings, Cheese, Fruits are among wealth of "sugar-free" items.

ALFRED J. FINBERG
Consultant in Food Technology, Brooklyn, N. Y.

True, the past 20 years have seen phenomenal rises in the manufacture of such products as baby foods, packaged dinners, and Kosher foods.

► But no phase of the business has grown so strikingly as dietetic foods.

For some time various "diet" products had been offered, such as water-packed fruits and vegetables sans sugar, mainly for diabetics. These appeared chiefly in health food stores, on obscure shelves of the corner grocery, or were purveyed via advertising in health magazines. They were noted for their lack of variety, poor taste, uninformative labeling, and high price.

Comes the Alarm on Obesity

Then a combination of factors began to operate: The biometricians, in many cases speaking for the larger insurance companies, began to point out the part played by obesity in many of the diseases that caused death after 45. Numerous authorities then asserted that overweight is the No. 1 health problem in favored food areas, such as the U. S. and Canada.

Medical authorities worked out therapeutic diets for diabetes, heart disease, hypertension, and kidney disease. They also developed improved methods of diagnosing these conditions earlier, and so found many more cases.

Discovering incipient cases greatly increased the incidence figures. A concomitant raising of life expectancy levels also increased the number requiring special diets.

Experts in nutrition were defining, in more and more detail, the minimum daily requirements of the known nutrients. The dietitians, in turn, were translating and modifying dietary restrictions into practical working recipes and menus.

People engaged in health education, both on a professional and popular level, were soon joined by powerful voices in the advertising field. Every fashion magazine and homemaking journal was filled with propaganda intended to encourage weight reduction by young as well as old. Even without the influence of the many food faddists appearing on the lecture platform, radio, and TV, a considerable number of food processors visualized vast untapped markets.

Why not supply the 35,000,000 obese individuals with special low calorie foods? . . . The many millions suffering from heart disease, hypertension, and kidney disease with low sodium foods? . . . And the up to 10,000,000 diabetics with sugar-free foods?

The idea was no longer a side-line for a few small poorly financed companies. It was a large scale operation worthy of the study and efforts of the most powerful.

No longer do we find the specialized dietetic foods solely in such places as health-food stores. Every grocery and supermarket now features hundreds of products suitable for therapeutic or reducing diets. And along with the growing availability, it is found that price levels are more equitable, in some cases a dietetic item being only a cent or two more than its non-dietetic counterpart.

Accordingly, a diet need no longer mean deprivation. Instead, the patient may choose from a variety of properly prepared, good tasting foods. No special shopping or difficult, time-consuming cooking or measuring is required.

In addition, dietetic foods are found primarily in small packages that make for variety and cause little waste.

A particular boon to individuals who must eat according to a prescribed diet is the wealth of dessert and confectionery items. Thus, diabetics, who may have an inordinate craving for sweets, are free to satisfy it.

This is specifically important, since nutritionists empha-

Also Cereal Products . . .

Dietetic Foods

size psychological motivation as a factor in reducing diets. Relapses to overeating are less common if the patient can derive needed satisfaction without attendant calories. Now that sweets are available in low calorie, sugar- and sodium-free form, any diet is made fairly pleasant rather than the rigorous thing it was formerly.

It is evident, therefore, why sales figures rise as the public changes many of its food habits, since its desire to eat less fattening foods is strengthened by the efforts of the manufacturers. It is also understandable why a $250,000,000 volume in dietetic foods is anticipated this year, when more than 200 companies have been active.

As with any new movement, however, there are accompanying difficulties and drawbacks. Such was the case in this field until the FDA, and other agencies, made moves to formulate specifications for content, labeling, and control.

At the outset, most of the products were poor tasting. There was lack of uniformity in measuring the constituents and in labeling. To complicate matters further, there was complete lack of uniformity in the requirements of each state. Only recently, for example, the last state restricting sale of beverages containing artificial sweeteners removed its legislative barrier.

Four Major Types of Products

To be sure there are many who feel that much of the purchasing of dietetic foods is fostered by high-pressure advertising. There are also medical authorities, who hold completely independent views that a moderate amount of sugar is useful in reducing diets, both to aid the dieter psychologically and to boost the blood sugar level and thus minimize feelings of hunger.

Ignoring the controversies, it must be admitted that in purely therapeutic cases dietetic foods are of tremendous importance. They can be classified into the following groups of major commercial influence:

1. Low calorie foods for reducing. These must be low in total calories but nutritionally adequate in proteins, vitamins, and minerals. The greater percentage of weight-producing elements. such as excess carbohydrates and fat, must be removed.

Principal usage is in weight reduction for obesity, and thus possibly in preventing hypertension, coronary disease, and diabetes, although the cause and effect of these diseases is controversial.

Due to the many labor saving devices used in the home and in industry, more beneficient labor laws and shorter working hours, and more sedentary methods of spending leisure time, it has been necessary to revise the table of recommended daily diet allowances. Object was to assure that needed minerals, vitamins, and proteins are supplied, even though there is a reduction in total calories.

2. Diabetic diets are signified by regularity of eating, a good balance of carbohydrates at each meal, and proper control of insulin and activity. The individual must know the nutritive elements contained in each food if

• First, there were only tasteless, unappetizing water-pack fruits and vegetables. But now we have hundreds of normal-tasting, low calorie, low-sodium, sugar-free foods. And '55 is seen totaling a $250,000,000 volume.

he is to keep the intake constant. He must also have reasonable quantities of food and no severe limitations in types of dishes to keep him motivated to stay on the diet.

Latest method of standardizing diabetic diets has been worked out by the Committee on Diabetic Diet Calculations of the American Dietetic Assn. in cooperation with the American Diabetes Assn. and the U. S. Public Health Service.

These diets class foods into six "exchange" groups: Milk, vegetables, fruit, bread, meat, and fat. Foods in each group contain roughly equivalent amounts of protein, fat, carbohydrate, and other nutrients. The patient can then follow a prescribed diet whereby he is allowed so many servings or "exchanges" from each group.

Dietetic foods properly labeled in terms of calories and containing no sugar are of inestimable use in these cases.

Sucaryl has made it possible to supply diabetics with cakes, beverages, jellies, and candies to make the diet more pleasant.

3. Low sodium diets for hypertension, heart disease, and kidney disease, and in pregnancy to prevent edema (accumulation of fluid outside of the blood vessels), are characterized by control of sodium ingestion. This is accomplished by eliminating certain foods completely and cutting down on others. There are three levels of restriction: (1) Mild (50%), (2) Moderate (75%), and (3) Severe (90%).

Dietetic water-packed canned fruits and vegetables, and other low sodium foods that enable the patient to keep

. . . Confections . . .

. . . Baked Goods

records of sodium intake, are available in these diets.

4. Bland diets comprising foods low in crude fiber are useful, not only in infant and child feeding, but also in management of peptic ulcers and other gastro-intestinal disturbances. The numbers and variety of strained and chopped foods are constantly increasing.

An offshoot of the so-called "baby foods" has been the current development of geriatric or "senior foods". These seek to serve the specialized needs of the constantly increasing percentage of older people in the population. Many of these persons live alone and have poor facilities for food preparation.

These products are being tested in several areas. They are low in sodium, calories, and fats, high in protein and minerals, and fortified with vitamins.

There are additional diets which, due to limited application or unproven value, have little commercial importance. These include: High calorie, high residue, low cholesterol, and low purine.

It must be emphasized that in every one of the diets discussed, medical diagnosis and supervision should be constantly in force.

The varieties of specially packed dietetic foods number in the hundreds and are being added to constantly. Some of these are listed in an accompanying special panel.

Early dietetic foods were marked by poor taste and texture and objectionable aftertastes that produced little psychological advantage. They were, in actuality, foods of a marginal nature.

Some performed their function by merely withholding the offending element. Thus we see sugar-free fruits and vegetables, tuna fish packed without oil, and skim milk.

The artificial type of sweetener, launched with the discovery of saccharin in 1879, has a long history. Until recently, however, application of saccharin has been limited, due to its heat instability and bitter aftertaste.

Historically, it is of interest to mention the use of mineral oil in salad dressings and lithium chloride as a salt substitute, both of which resulted in unfortunate consequences before being banned.

Continuous Improvement

The move for more acceptable, better tasting products is being accomplished in many ways:

1. Improved methods of formulation enabled through use of palatable but non-metabolizable ingredients, such as Sucaryl.

At present, Sucaryl and saccharin are the only substances approved by FDA as synthetic sweeteners for food. Since they provide no food value, but only flavor, they are not considered to be sugar substitutes.

Sucaryl is especially noteworthy, since it is relatively resistant to high temperatures and thus can be used successfully in cooked and baked goods. It may be obtained in two forms, sodium or calcium cyclamate, the latter being used when a low sodium level is required.

Sucaryl or saccharin, and frequently a combination of the two, have been employed to excellent advantage in canned fruits, syrups, and beverages. Taste panels have unanimously selected fruits sweetened in this manner in preference to water-packed products. The syrups are commonly thickened to achieve mouth-feel.

2. Making up for the lack of salt and sugar by increasing or substituting other spices. In doing this the food may not have its accustomed taste initially, but its tang or zest soon compensates for saltiness. Used here are garlic, onion, pepper, and herbs. And the technique is successful with soups, sauces, and dressings.

3. Enhancing inherent flavor, such as in meats, sauces, dressings, and some vegetables, with monosodium glutamate or monopotassium glutamate. But it must be borne in mind that excessive use of potassium is potentially harmful to those with impaired kidney function.

4. Salt substitutes, although at best a compromise due to their sharp biting taste, serve the purpose of salting food to gain the familiar taste. Carbonates, glutamates, potassium chloride, and other compounds, come into play here, sometimes mixed with spices or herbs. These have value only when used at the table. They have none in commercial packing, due to their inability to withstand processing or high pH.

5. Attempting to achieve texture and consistency of familiar non-dietetic foods by using various stabilizers. Pectin, carboxymethyl cellulose, Irish moss derivatives, algins, and other vegetable gums, all have important functions in thickening products such as syrups and dressings. It should be emphasized that the sodium content of these stabilizers, especially Irish moss and algins, is such that they cannot be used in low sodium products.

6. Appetite satients, noted although they have no food value. These may or may not be fortified with vitamins. Carboxymethyl cellulose is used as a filler, thus curbing the appetite temporarily. There is only a transitory effect at best and no permanent health value results.

Problems of Production

Formulation of dietetic foods has in it all the inherent problems of the regular packing of foods, namely: Correct processing data, shelf life determination, and fermentation. Superimposed are others, such as loss of body.

Supplanting sugar by Sucaryl in a formula means a considerable lowering of total solids in a product. In items such as ice cream, jams, and gelatine desserts, the bulk must be obtained in some other way, depending on the individual product. Glycerine and sorbitol provide texture and body in dietetic jellies, while Irish moss derivatives are useful in salad dressing.

Foaming, a condition encountered in low calorie beverage manufacture, may be controlled by the use of buffers, such as sodium citrate and specific anti-foaming agents.

With a lower percentage of soluble solids present in dietetic jam manufacture, it is difficult to obtain a firm "set." This problem is met by addition of calcium ions to insure gelling of the pectin.

In the bakery field, skim milk solids have been found to afford good bulking, while lowering the calories usually supplied by sugar and shortening. Defatted flours from soy beans and cottonseeds, or other grains, are also utilized.

Informative Labeling

For many years, the medical profession, through its official organization, the American Medical Assn., and its Council on Food & Nutrition, provided a form of leadership in the field of dietetic foods by calling for certain requirements in content and label declaration.

Products that conformed to the published requirements merited the Seal of Acceptance, which could be reproduced on the label. They were also accepted for advertising by the *AMA Journal* and affiliated publications. This seal gradually became a symbol of quality to the public and thus served a vastly important purpose.

General Decisions on Foods and Food Advertising, a booklet published by the Council on Foods & Nutrition in Jan. 1948, did much to aid in the dissemination of sound and reputable labeling practice among manufacturers.

On Feb. 19, 1955, AMA's board of trustees terminated the Seal-of-Acceptance program, reasoning that legislation and government regulations had superseded its efforts.* Formerly, there had been many products whose manu-

* The AMA Seal will not be seen after the present printed labels have been used up, so it is a mere matter of time before it will have only historical value.

DIETETIC FOOD FORMULAS

Low Calorie Salad Dressing

Ingredient	Percent
Starches	5.0
Stabilizers	1.0
Salt and spices	6.8
Vinegar and water	65.0
Egg yolk	8.0
Vegetable oil	14.0
Calcium cyclamate	0.2

Dietetic Jam Using Glycerine

Ingredient	Percent
Crushed fruit	51.0
Water	41.5
Glycerine	6.0
Low methoxy pectin	0.8
Citric acid	0.4
Calcium cyclamate	0.3

Sugarless Syrup (32 Be)

Ingredient	Percent
Water	84.0
Pectin	1.6
Calcium cyclamate	3.0
Flavor	8.5
Citric acid	2.0
Stabilizer*	0.5
Sodium benzoate	0.1
Color	0.3

*Irish moss derivative, CMC, or sorbitol.

Dietetic Jelly Using Sorbitol

Ingredient	Percent
Fruit juice	54.06
Water	27.5
Sorbitol	13.8
Low methoxy pectin	0.94
Citric acid	0.2
Calcium cyclamate	0.6
Ca Cl$_2$ solution (2%)	2.9

Instant Pudding (Not Low Sodium)

Ingredients	Percent
Calcium cyclamate	4.0
Pregelatinized starch	56.5
Irish moss	4.5
Calcium gluconate	16.0
Disodium phosphate	2.0
Sodium carbonate	2.4
Flavor	5.6
Color	4.0
Skim milk	5.0

Dietetic Frozen Dessert

Ingredients	Percent
Cream (40%)	30.0
Skim milk	58.0
Sorbitol	8.0
Glycerin	3.2
Gelatin (275 bloom)	0.3
Emulsifier	0.2
Calcium cyclamate	0.3

facturers cared nothing for the Seal of Acceptance and who offered for sale material that was misleading and even harmful. Today, the law is definitive. Furthermore, manufacturers are taking more and more responsibility in formulating and marketing worthwhile products.

Special FDA Directives

In addition to meeting the general food requirements of the Federal Food, Drug & Cosmetic Act, dietetic foods are subject to special labeling requirements set down in regulations under Sec. 403(j) of the Act.

Of particular importance are the following excerpts from the *Federal Register* of Nov. 22, 1941:

Sec. 125.02, General Label Statements: (a) If a food (including food to which one or more of the Sections 125.03 through 125.08 of the regulations is applicable) purports to be, or is represented, for any special dietary use by man, its label shall bear a statement of the dietary properties upon which such use is based in whole or in part. Such statements shall show the presence or absence of any substance, any alteration of the quantity or character of any constituent, and any other dietary property of such food upon which such use is based.

(b) If a food (including food to which one or more of the Sections 125.03 through to 125.08, of the regulations is applicable) purports to be, or is represented, for special dietary use by reason of its use for treating any disease resulting from a dietary deficiency in man, its label shall bear, in addition to the information required under paragraph (a) hereof, adequate directions for such use.

In Sec. 403(j) of Revision 4 (June 1953) of the Act, the following statements on misbranding are set forth:

A food shall be deemed to be misbranded if it purports to be, or is represented, for special dietary uses, unless its label bears such information concerning its vitamin, mineral, and other dietary properties as the Secretary determines to be, and by regulations prescribes as, necessary in order fully to inform purchasers as to its value.

Regulation Sec. 1.11, Special Dietary Uses: (a) The term "special dietary uses," as applied to food for man, means particular (as distinguished from general) uses of food, as follows–

1. Uses for supplying particular dietary needs which exist by reason of a physical, physiological, pathological, or other condition, including, but not limited to, the conditions of disease, convalescence, pregnancy, lactation, allergic hypersensitivity to food, under- and over-weight.

2. Uses for supplying particular dietary needs which exist by reason of age, including, but not limited to, the ages of infancy and childhood.

3. Uses for supplementing or fortifying the ordinary or usual diet with any vitamin, mineral, or other dietary property. Any such particular use of food is a special dietary use, regardless of whether such food also purports to be, or is represented, for general use.

By Nov. 1953, a need for amending the law, because of the growing importance of low sodium foods, was recognized by FDA. It stated:

Within recent years, low-sodium diets have come to be widely used in medical practice in the prevention of edema, a complication in some types of heart diseases and other diseases, and in the treatment of essential hypertension.

We have reviewed the labels and determined the sodium content of a large number of commercially prepared foods that are represented as, or purport to be, of value in low-sodium diets. They are labeled as "salt (or sodium) free," "low salt," "unsalted," "packed without added salt," "for use on low sodium diets," etc.

Less than one-third of the labels declare the amount of sodium present. The majority of the labels declaring the amount of sodium express it in terms of mg. per 100g., although such terms as "sodium 0.02%" and "sodium content not more than 50 mg. per 100g." are used. In some instances where the labels declare "salt free" without stating the sodium content, substantial amounts of sodium were contributed by leavening agents, sodium glutamate, or other ingredients.

At that time, FDA explained that frozen vegetables were presumed to be salt-free and thus used by many on low sodium diets. Actually it was noted that salt brine is employed in the preparation of certain of the frozen vegetables, particularly peas and lima beans, as a means of quality separation. This process adds a substantial amount of salt to the product, which has great significance for those attempting to limit the intake of sodium.

Hearings held in Dec. 1953 led to changes in the regulations effective Sept. 29, 1954. The recommendations made at the hearings evidenced cooperation between FDA, the American Heart Assn., and AMA's Council on Foods & Nutrition. Packers present at the hearings voiced no objections to the new regulations–

Sec. 125.9. Label statements relating to certain foods used as a means of regulating the intake of sodium in dietary management: If a food purports to be, or is represented, for special dietary use by man by reason of its use as a means of regulating the intake of sodium or salt (sodium chloride), the label shall bear a statement of the number of mg. of sodium in 100g. of the food and a statement of the number of mg. of sodium in an average serving of the food.

The average serving shall be expressed in terms of a convenient unit, or units, of such food, or a convenient unit of measure that can be readily understood and utilized by purchasers of such food.

For example, an average serving might be expressed in terms of a number of slices, cookies, wafers, etc., or in terms of cupfuls, tablespoonfuls, teaspoonfuls, etc.

Since passage of this regulation, FDA has used its seizure powers to remove from the market products falsely or inaccurately labeled, thus effectively to protect the public. And various states have demonstrated that they are following the leadership of the Federal Government.

Some states go further to require that, in order to avoid consumer deception, special dietary foods must be segregated from ordinary foods by being placed on separate shelves and cases. This follows the line of thought of the Assn. of Food & Drug Control Officials of the U.S., which has call for "careful restriction of labeling and isolated marketing as a protection of the general public while assisting those with special diets."

Misleading Advertising

Unfortunately, even the most stringent labeling laws may be overbalanced by misleading, unfair, or deceptive advertising. It is well known that consumers are more likely to read an attractive, persuasively written ad than a small unobstrusive label declaration.

Not much time had passed before many manufacturers climbed on the low-calorie bandwagon: A beer was represented as having fewer calories than its competitors. A spaghetti was declared to have less calories and more protein than meat, fish, or eggs. And even candy and sugar processors attempted to influence the dieting public as to the weight reducing qualities of their products.

It is encouraging to note the action of the Federal Trade Commission in curbing much of this advertising. It is clearly evident that account executives and copy writers, as well as food processors, must be impressed with their

responsibility from a health standpoint in order that dietetic foods may continue their progress to a rightfully respectable place in the retail food market.

Here, we have followed the emergence of special dietetic foods. And it is further evident that they are now firmly established.

The need for them can only increase, as does the medical field of knowledge. As diagnostic methods improve further, more people are placed on therapeutic food regimens. It is hoped that the educational process will be instrumental in influencing the public in a more preventive sense, so that young persons will correct their diets *before* they become obese.

Several avenues have been exposed for future exploration, and further improvements can be visualized.

The field of geriatric feeding, with its special nutritional requirements, should be developed further. Both small units for home consumption and large institutional size packages should be fostered.

While institutional feeding has been improving, it still has aspects that are untried. Restaurants and cafeterias could easily offer foods for special diets so that the many requiring them could be assured adherence outside as well as at home.

More informative labeling has been suggested by some —not merely of the specially prepared foods, but also of the regularly packaged products—as to calorie, sugar, and sodium content. Although this seems rather impractical it does bear consideration.

Further work must be done on artificial sweeteners, flavors, butter and flour substitutes. This, of course, includes long-term toxicity testing.

It has been seen that the Federal Government had to reassess its formerly rigid position opposing sugar substitutes, with the separate states following suit.

When certain undeniable facts become established among research workers and clinical observers, a relaxation of the traditional stand becomes mandatory. Thus it can be expected that future rulings and policies will change current ones in the best interest of nutritional welfare.

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DIETETIC FOODS
Are Now Available
In Large Numbers

Fruits and Juices Packed Without Salt or Sugar

Applesauce
Apricots
Blackberries
Blueberries
Boysenberries
Cherries
Citrus fruits
Figs
Fruit cocktail
Fruit salad
Grapes
Loganberries
Peaches
Pears
Pineapple
Plums
Raspberries
Strawberries
Cranberry sauce
Frozen fruits
Canned pie fillings
Apricot nectar
Grapefruit juice
Orange juice
Orange and grapefruit juice
Orange and tangerine juice
Pear nectar
Pineapple juice
Tangerine juice

Vegetables Packed Without Salt or Sugar

Asparagus
Green beans
Lima beans
Soy beans
Wax beans
Beets
Carrots
Chili sauce
Corn
Mushrooms
Peas
Peas and carrots
Spinach
Sweet potatoes
Tomatoes
Mixed vegetables
Tomato juice
Soups

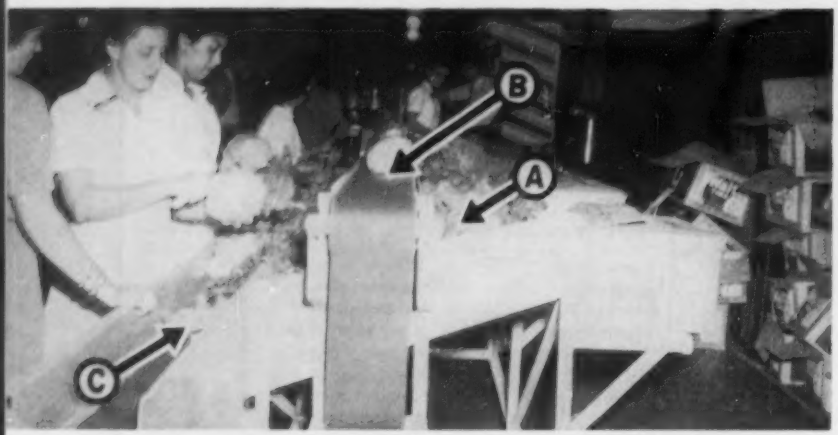
Other Products Packed Without Salt or Sugar

Fruit jellies and spreads
Syrups and concentrates
Chewing gum
Cereals
Candies
Soups
Salad dressings
Baked goods
Dessert puddings
Freeze-mixtures
Toppings and whipped cream substitutes
Carbonated drinks
Cake mixes
Fruits packed with saccharin and pectin
Fruits packed with sucaryl, saccharin, thickeners

Low Sodium Products

Bottled milk
Soups, canned and dehydrated
Vegetables
Baked goods
Cheese
Vegetable juice
Cereals, spaghetti products
Canned meats
Canned fish
Salad dressings
Candy
Jams

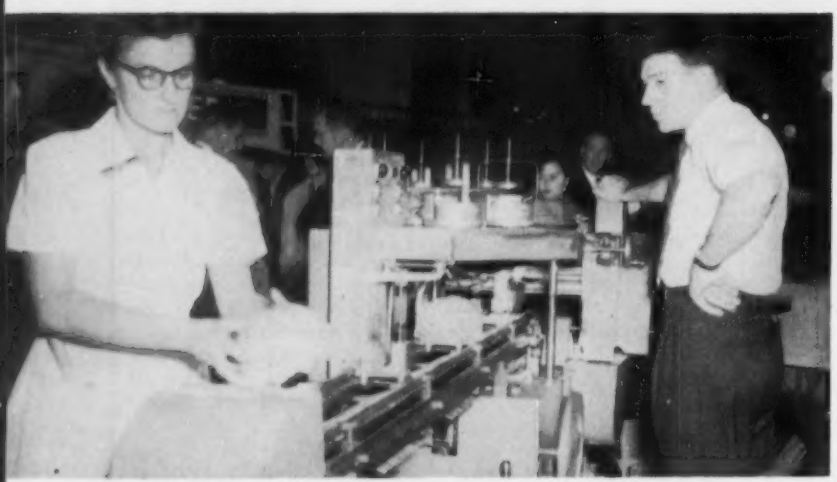
Lettuce Trim Line, Wrapper



SET-UP for trimming lettuce comprises sponge-rubber padded dump bin (A), take-away conveyor (B) for trimmed heads going to wrapping unit, and refuse belt (C) along which girls work on heads. Maker: American Machinery Corp., Orlando, Fla. (76A)

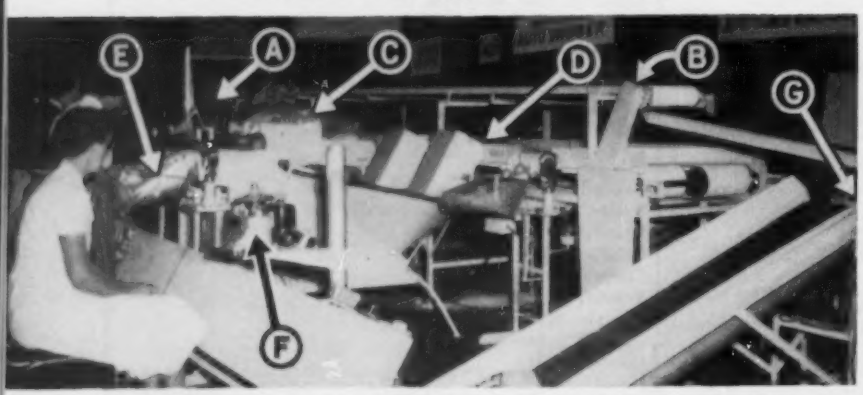
Latest Prepackaging Units

Here are 15 that were viewed at Produce Packaging Assn.'s recent 5th Annual Conference in Chicago



VARIABLE SPEED machine wraps 30-65 heads of lettuce per minute in roll-fed, perforated, transparent film, drawn over sides and bottom of product and heat-sealed over butt area. Sealing units are thermostatically controlled.—Wrap-King Corp., Holyoke, Mass. (76B)

5 Semi-Automatic Bagging Machines



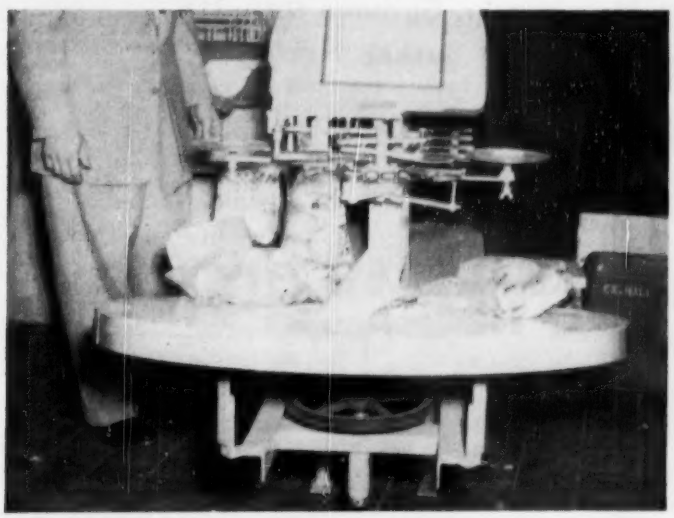
COMPLETE fruit (and spuds) bagging line consists of 600-box/hr. dumper (A), empty box conveyor (B), roller-grader (C), 2-way distributing belt (D), twin-head baggers (E), bag-closing unit (F), and carton-packing station (G). Displayer: The Trescott Co., Fairport, N. Y. (76C)

NEW twin-unit bagger weighs, while it packs, 3- to 25-lb. bags of various types.—Produce Equipment Co., Salt Lake City. (76D)

WEIGHER-BAGGER features bucket elevator for feeding trimmed radishes from hopper and to unit. Speed on single-header is 30/min. Maker: Frazier & Son, Clifton, N. J. (77A)

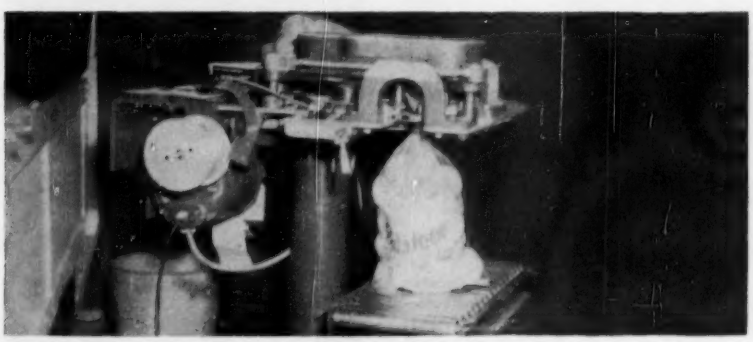
PORTABLE produce weigh-bagger has built-in scale and feed hopper (300 lb.). Handles 1-10 lb. Feed cuts off at correct weight.—Exact Weight Scale Co., Columbus, O. (77B)

3 New Bag Sealers



60 TO 80 bags-per-min. unit applies pressure-sensitive tape (from two rolls) to 1 to 10-lb. bags secured by quick-action clamps. Maker: J. H. Platt & Son, Los Angeles. (77D)

AIR-OPERATED bagger has pedal control and arms to guide product into bag. Bags are opened by volume-controlled air. Displayer: Tele-sonic Packaging Corp., N.Y.C. (77C)



AUTOMATIC UNIT closes open-mouth bags (2-100 lb.) by unique chain drives that compress top of bag and seal it by specially designed wire ring. Note staunch, pedestal-type design for easy operation, also compactness of various components.—Hamer Machine Co., Minneapolis. (77E)

BAG SEALER closes sacks with pressure-sensitive tape in one easy motion. Speed: Up to 30 bags/min. Maker: Better Packages, Shelton, Conn. (77F)

Tray Dispenser and Forming Unit

PLASTIC TRAY dispenser's six magazines hold 600 trays. Each magazine is preset to deliver 68 trays/min. Vari-speed motor drives horizontal shaft with metal pick-off pins. Through clutches, unit can deliver trays from any number of magazines.—Gilbert Plastics, Hillside, N. J. (78A)

TRAY FORMER automatically erects 100 trays/min. from 300-tray magazine.—Standard Folding Trays Corp., Jackson Heights, N. Y. C. (78B)

Waxer, Garbage Disposer, Berry Basket Nester

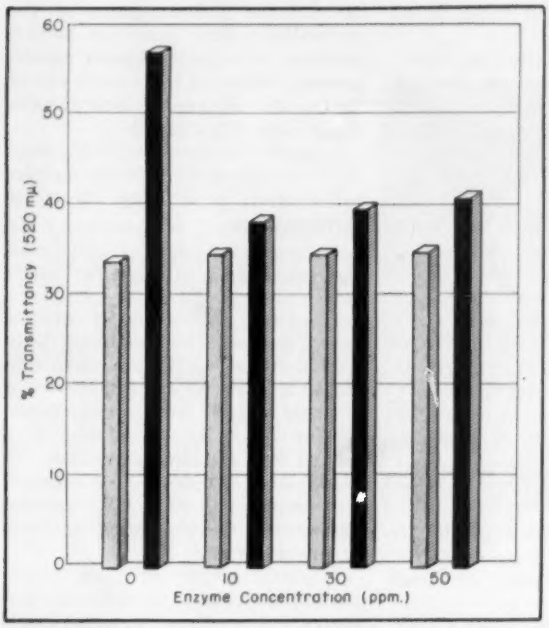
FLOOD-TYPE UNIT applies wax emulsion to roller-conveyed peppers or cucumbers. Surplus wax is strained as recirculated. Exhibitor: American Machinery Corp., Orlando, Fla. (78C)

For detailed information circle key numbers on Readers' Service Card in back of book

PRODUCE-WASTE disposer continuously grinds refuse into small particles and combines them with water for direct fluming into sewer.—Herlex Mfg. Co., Chicago. (78D)

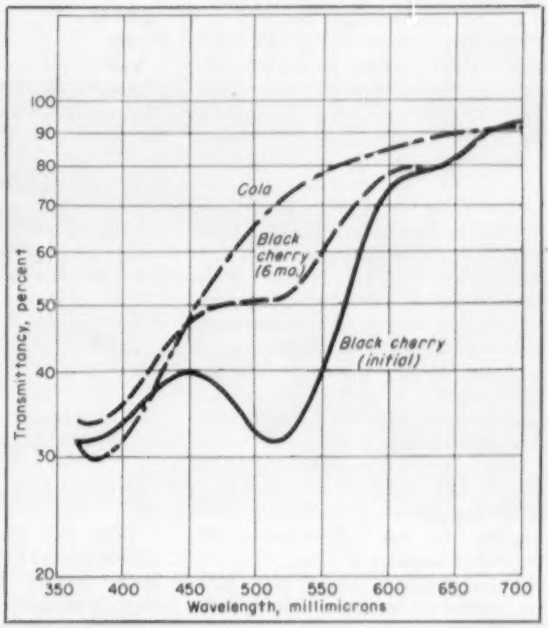
NESTER holds 12 baskets (pints). It has corrugated supporting divider, L-shaped legs (¼ in.), and bottom finger holes to release trays.—Container Corp. of America, Chicago. (78E)

TESTS SHOW DROP . . .



PREVENTION of color fading by glucose oxidase enzyme added to black cherry beverage is graphically shown. Shaded bars represent first-week tests on cans, while black bars show results after 6 months. Note drop in transmittancy (meaning less fading) with addition of only 10 ppm. enzyme.

. . . IN THIS COLOR LOSS



ACTUAL FADING of canned control sample (no enzyme) is detailed here over entire 365-700 m_μ transmittancy range. Only one line is shown for cola beverage, since value did not change on long storage. With black cherry flavor, maximum difference in transmittance occurs at 520 m_μ ("O" bars on chart at left).

Enzyme Protects Canned Drinks

Shelf-life extended by glucose oxidase, which retards iron pickup, cuts color fading

R. R. BARTON, S. S. RENNERT, and L. A. UNDERKOFLER

Research Dept., Takamine Laboratory, Inc., Clifton, N. J.

Much progress has been made in developing better liners and cans for soft drinks. Yet problems of corrosion, color fading, and flavor changes are still with us.

Thus the research described here—to test the possibilities of reducing these quality-destroying effects.

And it can now be stated that addition of an enzyme glucose oxidase preparation is practical and gives these three benefits:

- **It causes no detectable flavor changes.**
- **Definitely impedes fading of sensitive colors.**
- **Materially retards iron pickup by removing residual oxygen (though iron pickup depends also on other factors).**

From the equations (see panel), it can be seen that glucose oxidase (A) removes glucose in the presence of oxygen or hydrogen peroxide, and (B) removes oxygen in the presence of glucose (and glucogenic substances).

Extensive use has already been made of the first reaction in "de-sugarizing" eggs before drying[1]. In soft drinks, however, latter process is used to tie-up residual oxygen.

For this oxygen is, in large part, responsible for corrosion, iron pickup, and color and flavor changes in canned beverages.

How Enzyme Works Chemically

Commercially, the agent is produced as a water soluble powder containing both glucose oxidase and catalase.* It catalyzes oxidation of glucose in this way:

$$C_6H_{12}O_6 + O_2 + H_2O \xrightarrow{\text{glucose oxidase}} C_6H_{12}O_7 + H_2O_2$$

$$2H_2O_2 \xrightarrow{\text{catalase}} 2H_2O + O_2$$

Net reaction, therefore, is—

$$2C_6H_{12}O_6 + O_2 \xrightarrow{\text{enzyme system}} 2C_6H_{12}O_7$$

Thus, for every mole of glucose oxidized, ½-mole of oxygen is used up.

*For comprehensive report, see "New Enzymes Open New Doors" by E. G. Snyder (FE June '53, p. 89).

How Tests Were Made

Sample beverage packs of black cherry (containing Azo-type food dye) and cola (containing no such dye) were put up at the Continental Can Co. laboratory in this way:

First, a distilled water solution of DeeO (registered trademark of glucose oxidase enzyme marketed by Takamine Laboratory, Inc.) was made up in such concentration that 1 ml. added to 12 oz. of product gave 10 ppm. of DeeO in the product.

Then flat-top soft drink cans, from an experimental lot, were washed and varying amounts of the solution added. Can was subsequently filled with prod-

uct, carbon-dioxide gassed, and closed on a laboratory beverage line.

This line consists of a water treatment system (Infilco), a carbocooler (carbonator and cooler), a 16-spout automatic filler, and a C.R. high-speed, low metal-exposure double seamer equipped with undercover gassing device.

Control samples were packed in bottles by transferring product from filled but un-seamed cans. Other control samples were packed in cans without addition of the enzyme solution.

Cans and bottles were then coded and stored at room temperature, some in Clifton, N. J., and some in Chicago.

Immediately after packing, random samples were opened to get initial data on carbonation, air, and Brix.

Information thus obtained (see Table I) showed that air contents of the pack represented excellent canning practice, and was well below recommended maximum of 5 ml.

Then, less than a week after packing, checks on corrosive values, taste, color, and iron contents were conducted on random samples selected from the lots. And these tests were repeated after 1, 3, and 6 months of storage.

Values for corrosivity are represented by numbers on an arbitrary scale. These are, in turn, related to the amount of current produced when tin and iron electrodes are immersed in beverages under certain controlled conditions.

On samples, these values were determined by Continental Can Co. after 2-months' storage. Used was a special company-developed instrument for estimating soft drink shelf life.*

Resulting data (Table II) indicated that addition of the enzyme solution has little effect on inherent corrosiveness of beverage ingredients—but does curb destructive work of air or oxygen.

Effects on Flavor

Taste tests were made by the triangular method at 1, 3, and 6 months' storage levels. Ten tasters were used on each evaluation.

Flavor of the canned control sample, containing no enzyme, was compared with that of canned samples containing different concentrations of the preparation. Also, tastes of bottled beverages were judged against canned samples containing the same levels of the enzyme. All samples were at room temperature when tested.

In no test, at any storage level, could any taste difference between samples and controls be detected for either beverage flavor.

Controls Fading

To judge color stability of the canned product, absorption curves were plotted over a 365-700 mμ wavelength range. A Coleman spectrophotometer was used to make these measurements. And to aid tests, cola samples were diluted with 10 volumes of water, and black cherry samples with 3 volumes.

Presence or absence of the enzyme had no effect on cola absorption curves in any of the tests.

Canned samples of black cherry showed no change in first-week test curves. And they increased only

(Turn to page 198)

How Enzyme Acts In Soft Drinks

TABLE I—CARBONATION, AIR, AND BRIX in Test Pack of Cola and Black Cherry Beverages

	DeeO (Ppm.)	Carbonation (Volumes) Avg.	Min.	Max.	Air (Ml.) Avg.	Min.	Max.	Brix
Cola	10	3.5	3.4	3.5	1.2	1.0	1.5	11.40
	30	3.4	3.4	3.5	1.1	1.0	1.6	11.40
	50	3.4	3.3	3.5	1.1	1.0	1.3	11.40
Black cherry	0	3.0	2.8	3.1	1.0	0.7	1.2	13.70
	10	2.8	2.6	3.0	1.1	0.8	1.4	13.60
	30	2.8	2.7	2.9	1.1	1.0	1.5	13.60
	50	2.8	2.7	2.9	1.1	1.0	1.6	13.60

TABLE II—CORROSIVITY Results (Microamperes x 100), Where Increasing Values Indicate Increasing Corrosion Capacity

	DeeO (Ppm.)	Nitrogen Flushed 2 hr.	4 hr.	23 hr.	Air Flushed 2 hr.
Cola	0	39	32	21	500
	10	36	28	18	530
	30	34	29	20	470
	50	33	31	21	520
Black Cherry	0	39	40	36	390
	10	35	35	32	380
	30	41	42	34	280
	50	55	42	34	250

TABLE III—IRON CONTENTS (Ppm.)

Container		DeeO (Ppm.)	STORAGE TIME 1 mo.	3 mo.	6 mo.
Bottle	Cola	0	0.5	...	...
Can		0	0.8	1.3	2.9*
Can		10	0.7	1.1	2.3
Can		30	0.7	0.5	1.9
Can		50	0.7	0.6	1.0
Bottle	Black Cherry	0	0.3	...	...
Can		0	0.5	1.3	4.5
Can		10	0.4	0.9	0.8
Can		30	0.5	0.4	1.1
Can		50	0.4	0.5	0.5

* For cola samples, 6-month results are averages of three individual cans. All other results are five-can composites.

TABLE IV—IRON ANALYSES (6 Mo. Storage)

Re cola samples, Takamine Laboratory results are averages of tests on three individual cans, whereas Continental Can Co. results average five individual cans. On black cherry, all results are five-can composites.

	DeeO (Ppm.)	Iron Content (Ppm.) Takamine Avg.	Takamine Range	Continental Can Avg.	Continental Can Range
Cola	0	2.93	2.4-3.9	1.56	1.4-1.7
	10	2.33	2.2-2.5	1.96	1.1-3.0
	30	1.87	1.4-2.6	1.06	0.5-1.8
	50	1.03	0.7-1.3	0.88	0.3-1.3
Black cherry	0	4.5	...	2.0	...
	10	0.8	...	0.5	...
	30	1.1	...	0.7	...
	50	0.5	...	0.7	...

IN CONTINUOUS EXTRUSION of dough strands, special head produces riffles that give maximum surface area, thus speed baking. Regulated pressure inside head controls production volume and product properties.

Flour to Product in 17 Minutes

Flexible, non-stop line makes cracker meal and related mixes automatically . . . Modern instruments give close control of color, taste, size, absorption, ash, moisture, and protein

PAUL ANGELL and GEORGE M. KOVAC

Respectively, president, Newly Weds Cracker Co., and president, Cog Corp., Chicago

Fast production can also be *flexible.*

Proof of the pudding is the round-the-clock, 7-day-a-week operation at the Chicago plant of Newly Weds Cracker Co.

Here, flour is transformed into cracker meal or custom-blended breading mixes in just 17 min. And, the set-up is run by only two men, who turn out 6,000 lb. of finished product every hour.*

Resultant material is used as low-cost extenders and thickeners in such products as soups, mixes, and dietary foods. By adroit equipment layout, company makes a variety of products on a single line. And further, maintains rigid specifications for such vital properties as high and low absorption rates, different moisture levels, preferred taste and color, and protein and ash specifications for the dietary products.

From the first, it was clear that the line must be a highly versatile, 24-hr. operation to do away with costly oven heat-up time and to produce constant-quality goods, on a large-order basis.

Not until a method was found for continuously making the dough could this be achieved.

Solution to the problem was found in a dual-function unit employing impact-in-air principles of size reduction and a spray-blend technique.

Processing units—all down the line—were selected with great care to avoid production bottlenecks. Case histories of some machines in the initial pilot installation clearly showed that they wouldn't stand up under full-scale requirements.

Accordingly, changes were made. Conveyors and size-reduction equipment, as well as packaging, storing, and blending machines were all modified to meet top production demands.

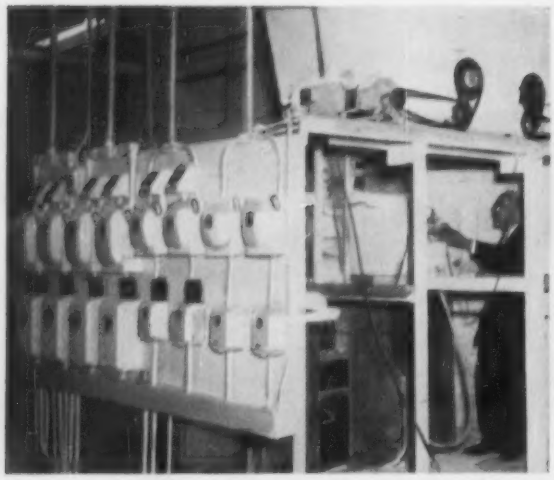
Flexibility was further engineered into the new line in these twelve ways:

1. **Flour receiving system accommodates a variety of carriers.**
2. **Metal holding bins store—and blend—flour.**
3. **Specially-designed dough-making machines mix water and flour.**
4. **Dough "ropes" can be made, and extruded, at different rates.**
5. **Continuous oven is speed-adjustable for baking-time changes.**
6. **Chopped crackers can be by-passed into holding drums to permit cleanup of grinding equipment without stopping production.**
7. **Strategically located ports divert product flow to various grinding operations.**
8. **Meal can be shunted from coarse pre-grinder directly to sifter.**
9. **Size-reduction unit has adjustable speed and screen openings.**
10. **Sifter screens are interchangeable to control fines and tailings.**
11. **Additives are metered into flowing meal from battery of variable-feed hoppers.**
12. **It is possible to pack final products into a variety of different-sized packages.**

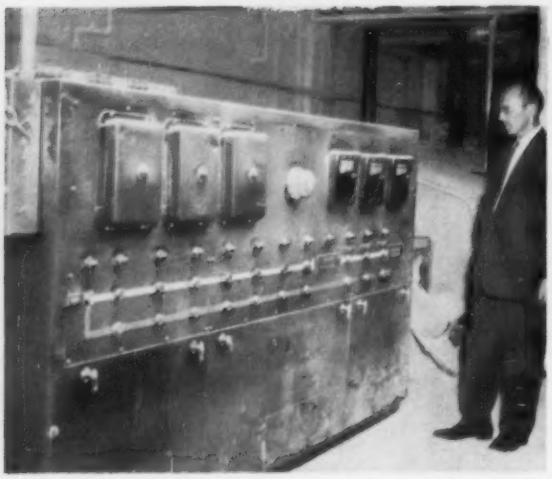
Step-by-step processing details follow:

Starting with the initial operation, unloading flour, provision has been

*Newly Weds is applying for a process patent covering this full-line operation.



CENTRAL PANEL provides electrical process control through ammeter readings—particularly regulates spray-blending equipment (seen behind panel).



OVEN is actuated from this special board, equipped with temperature controller-recorders and safety regulators for purging and firing non-stop unit.

made to bulk-receive from freight cars and truck trailers, as well as in 100-lb. bag lots. Rail car flour is dumped into a receiving hopper, located below the tracks. A blower (Roots-Connersville) air-conveys flour to three 61,000-lb. storage bins at the rate of 50,000 lb. per hr. Bins are equipped with electronic probes (Fielding) that sound a warning horn and shut off blower when flour reaches top-bin level. Flow can be changed in seconds by shifting blower hose to any of three pneumatic tubes through quick-disconnect couplings.

When hopper-bottomed trailers arrive, a portable hose is used to pneumatically convey flour to bins through the same three tubes and couplings used for rail cars.

Bagged flour, also, is handled in this system. Bags are dumped into a floor-level hopper located inside the building adjacent to the trailer and freight car delivery area. A rotary valve, at bottom of hopper, is closed while bags are being dumped. Then valve is opened and flour enters tube lines.

Most important advantage in this system is that different varieties can be stored at the same time to permit blending of wheats for needed variations in product properties. Bins discharge flour into a common horizontal screw conveyor. And formulas are controlled by merely regulating speed of special discharge screws located in bin bottoms.

Flour or blends then travel by a series of screw conveyors to a surge hopper positioned over a pair of impact-in-air comminutors (Cog).

From the twin-bottomed hopper (about 100 cu. ft. capacity), two screws feed measured amounts of flour into vibratory feeders. Amplitude of these latter units is rheostat-controlled. Their function is not to vary feed, but to level out flight-by-flight discharge of the single-pitch screws, and thus eliminate surges and assure uniform delivery into spray-blending comminutors.

It should be noted that multiple-pitch screws were tried on this operation first. But while they did level off surge, they tended to clog. Large diameter screws eliminated clogging, but brought back surge, since they ran at low speed.

Each screw feed is driven by a variable-speed motor, and both are accurately calibrated to account for slight differences in flight spacings and flume clearances. Also, hopper is equipped with an electronic probe that accurately controls maximum and minimum flour levels. Thus, screw-feed accuracy is assured by a relatively constant head. Probe is interlocked with motors driving screw conveyors from storage bins. Manual operation is provided on central switchboard to over-ride probe control, but automatic action is used for normal processing.

YOU'LL FIND a graphic 4-page foldout flowsheet of NWCC's continuous meal-and-mix production line on pp. 120-123.

In the impact-in-air spray-blenders, metered water (200 F.) is introduced to make the dough continuously. Tests show that hot water assures a better mix and increases oven efficiency by cutting down baking time. Thus, city water is first run through a gas-fired, thermostatically-controlled flash boiler. Metering equipment is made unique by its simplicity and freedom from maintenance.

Since city water pressure is unreliable here, line pressure is automatically adjusted below minimum swing. This was found to be about 15 psi. Thus, micrometer-equipped bellows-type regulators were installed in the two water lines to drop pressure to 3 psi. Slight changes can be made to permit flexible proportioning of water for products with different moisture-level requirements. Spray is introduced into blenders through orifice-plates. Thermometers are on lines so that operator can see if flash heater is functioning properly.

Advance Design Features

Advantages of the Cog comminutor determined its selection for the job. Plus-features include snap-apart construction of machine inlet and outlet for rapid and easy cleaning, no hidden recesses to hold dirt, ready removal of rotor from shaft, integrally-mounted over-size bearings in a line-bored spindle housing, separation of all bearings and moving parts from product blending area and a sanitary enclosure.

Machine design permits easy installation of right- or left-hand drive assemblies. And "opposites" are nested side-by-side at this plant to save space.

Each unit is mounted (but not fastened) on angle-iron rails. During cleaning, machines are pushed along these rails to expose extruder screws and provide sufficient room for workers to get at machine parts.

Proper spray-blending is achieved through a combination of features. Correct throat opening and entrance angle to blade path are important. Equally vital is spray direction, and there is an arrow outside the unit to indicate the right water path. Fixed blades with impact edges on both

sides (that reverse for longer life) and special spacing are provided on rotor assembly.

A V-belted, 10-hp. motor drives rotor at high speed (about 50,000 impacts per min.). Screens are not used. Instead special discharges guide dough into two screw openings.

These screws are specially designed and company-built. Each 8-in. unit is gear-motor driven and feeds into a common extruder head. Screws and comminutors can be run separately, if desired, to provide flexibility.

Screws are kept from clogging at the input (dough drops only by gravity from blender) by company-made scrapers, each of which is driven by a gear-head motor through an eccentric crank.

Continuous Extruding

High pressures developed in the extruder head (because of its diminishing opening design) constrict dough and make it homogeneous and dense. High-tensile bolts and armor-plate steel were used in constructing this head to withstand the great force.

Orifice openings are drilled in a special plate attached to extruder head. Through them about 60 continuous "ropes" of dough squeeze out side-by-side and fall on a 42-in.-wide, wire-mesh belt. Orifice design and extruding pressure riffles the surface on each strand, giving the dough maximum surface area and providing higher oven efficiency by stepping up baking time.

Extruded "ropes" travel on the wire belt through a 120-ft., enclosed, 3-zone oven (Werner) that has forced-draft, gas-fired burners located top and bottom. Oven is provided with a single control panel, which automatically regulates purging, lighting of burners, and baking temperature. Heat is normally held between 450 and 550 F., and is varied to give different colors and tastes to products.

At delivery end, baked dough is chopped by a double-blade rotating knife (company design) and forced through a screen to produce pieces of less than ½-in. size. These are conveyed to a 125-ft., cut-and-folded flight-type screw. Here, cracker pieces are agitated and cooled.

This conveyor is entirely covered by an exhaust hood that aids cooling and controls dusting caused by movement of the crackers. Exhaust is directed to a roof-mounted cyclone, where dust is separated and returned by metal chute and damper to a barrel located inside the building. This simplifies cleaning and eliminates hazards of roof storage.

Near the end of the 125-ft. run, chopped pieces have lost enough heat to permit final grinding. And a chain-operated gate directs flow into a mill (Prater) for pregrinding. This unit has its own cyclone, also located on the roof. Meal passes through mill and cyclone, then drops back down to the aforementioned cooling screw. Product enters this conveyor at a point 3 ft. ahead of the mill-diversion gate, then proceeds to the final impact-in-air grinder.

EXCLUSIVE USER of Newly Weds' output in the breaded foods field is Breader Mixer Div. of Doughnut Corp. of America, which processes cracker meal into scientifically controlled special-purpose mixes in a Chicago plant.

For versatility, the Prater cyclone has two other outlets. One diverts meal directly into drums, and the other leads (by a sock connection) to final screw conveyor that feeds bagging machine.

Furthermore, there is a chain-operated take-off gate located ahead of the Prater mill exit, with a chute extending down to drum height. The safety device allows by-passing of grinding operations if trouble occurs along the line.

Precision Grinding

Normally, however, product travels to an extra-wide, impact-in-air comminutor (Cog) that contains a fixed, dual-purpose knife and impact-edge rotor blades. Parts contacting product are stainless steel. Machine has same snap-apart, easy cleaning, and simple maintenance advantages as featured in the blending units. In addition, this machine offers a selection of knife and impact edges that assures fine control of particle size. Variable speed and interchangeable screens also aid this regulating process.

Operating at high speed from a belt-driven 20-hp. motor, this unit gives 200,000-plus impacts/min.

Discharge from size-reduction unit is made in a dustless manner directly into a sifter (Gump). No cyclone separator is needed, because control of fines is achieved by the sifter. Coarse tailings are continuously returned to grinder by a small screw conveyor.

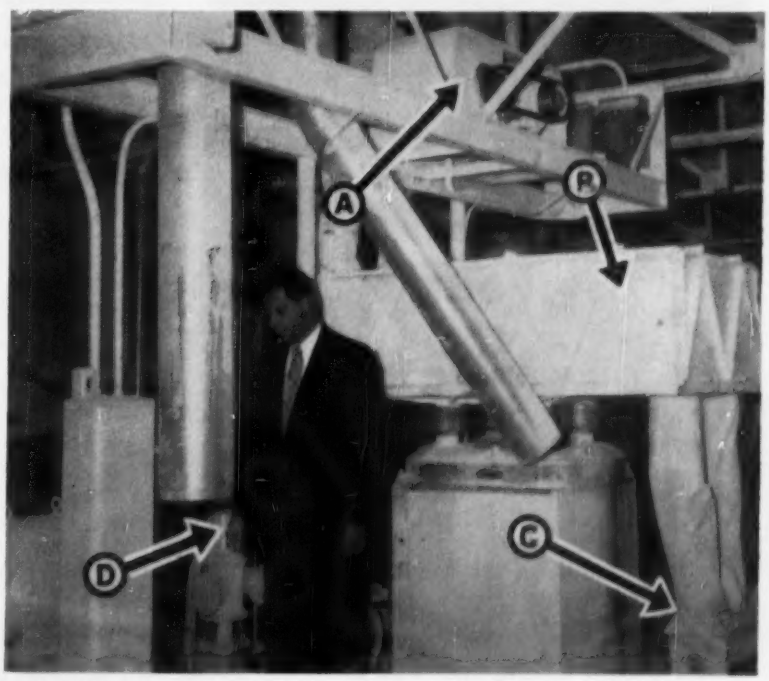
Sifter discharges through a sock into a 30-ft. floor-level screw conveyor, equipped with cut-and-folded flights.

In handling cracker meal, screw takes products directly to a vertical lift, where it is transferred at ceiling level to a short horizontal screw that feeds a large holding hopper.

This latter conveyor has a chain-operated gate and chute to divert product to drums, if desired. If holding hopper is full, this by-pass can be used to keep line in operation.

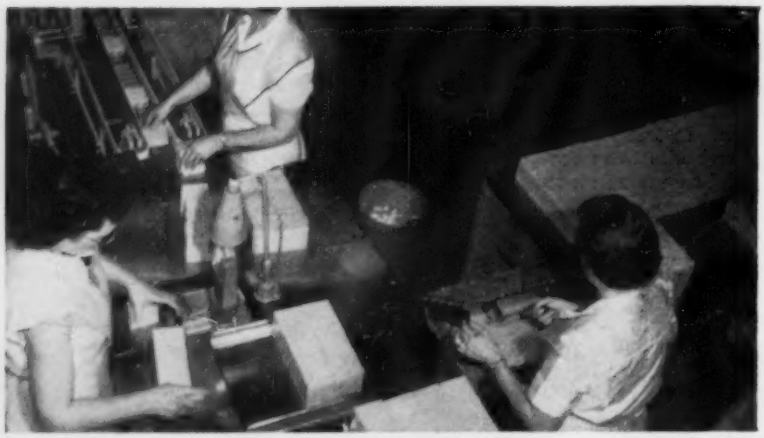
When breading compounds are run, portable blending bins with variable-speed bottom screws are positioned over the 30-ft. conveyor, which has a removable top section. Knowing the meal flow, additives such as

(*Turn to page 161*)

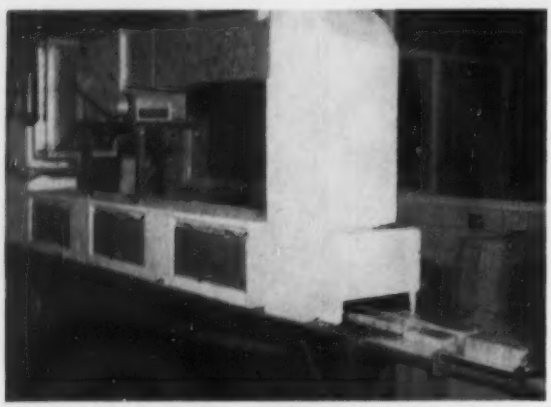


GRINDING is kept to a close tolerance in impact-in-air machine (A). Sifter (B) separates meal. Screw (C) handles product, and worms (D) recirculate tailings. Takeoff (behind man) permits by-pass of this final grind.

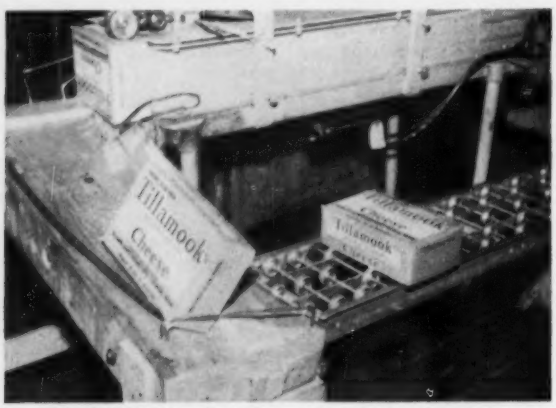
1 **NEW SLICER** is run by 1/3-hp. hydraulic pump. It replaces former hand device.



2 **CHECK-WEIGH TABLE,** of special design, speeds scaling operation and feeding of product to Pliofilm wrapper (rear). Cheese, in unit rows, slides easily over stainless steel top.



3 **HEATING TUNNEL** improves adherence of film-wrap. (Unit only partly insulated when photoed.)



4 **PNEUMATIC PRESS** seals glued cases. Novel-shaped chute saves space by reversing the case flow.

Line Performance *Snapped Up* By Four New Units

Coast company speeds slicing, weighing, casing, and handling of its cheese . . . Heating tunnel oil-seals film-wrap so slices keep better

FE STAFF

To get a substantial rise in your output demands pertinent engineering advances—if your efficiency is to be maintained.

This essential has long been kept in mind by Tillamook County Creamery Assn., Tillamook, Ore., where production of sliced ½- and 1-lb slabs of natural cheddar cheese is continually on the increase. And this company makes a perpetual project of its search for better methods and more effective equipment.*

Latest in this plant's progress are four line improvements. Two of these concern the cutting operations and the weighing routine—the former through replacement of a manually operated cheese cutter with a hydraulic unit, and the latter by addition of a new high-performance check-weighing table.

The other two advances have provided better film wrapping and casing.

Each will be noted in the following production run-down:

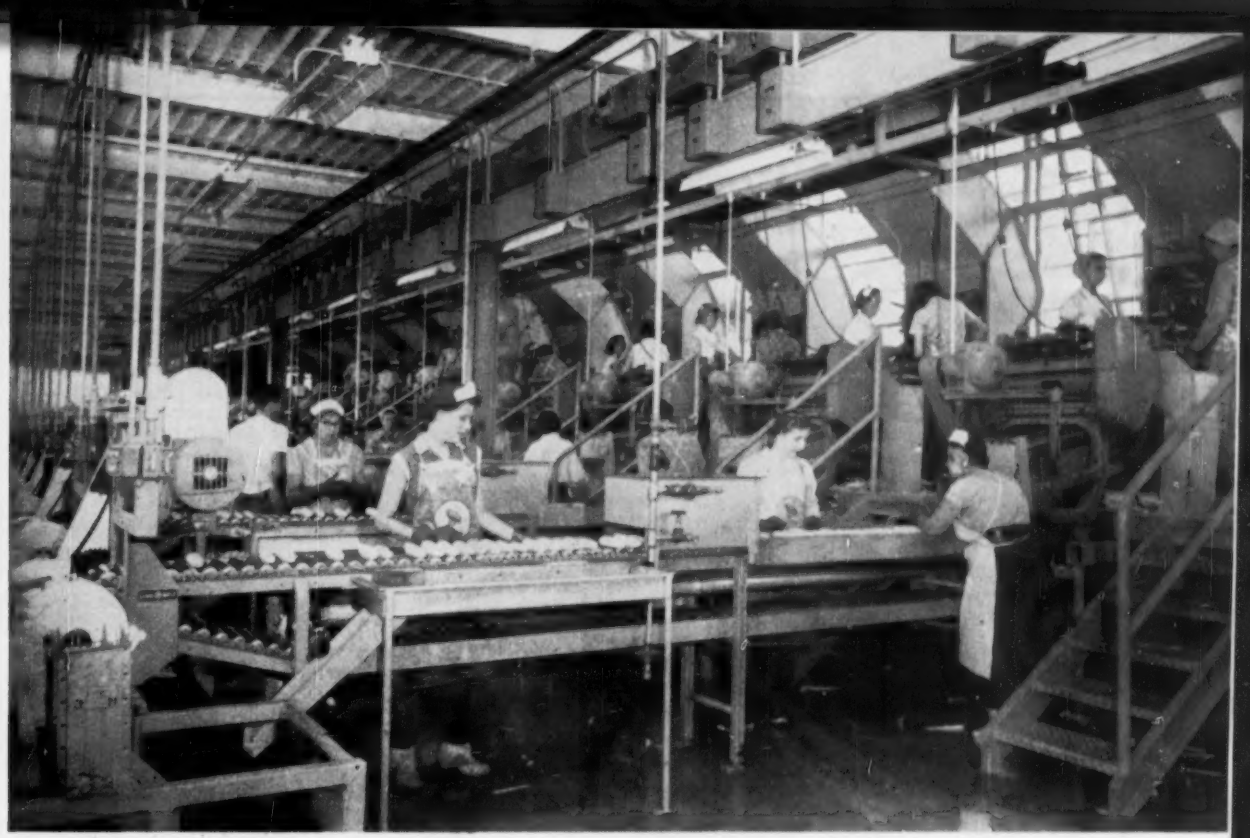
Better Ways

Squares (20 lb.) of cheese, coming from the 80-deg.-F. curing room, are first unwrapped and inspected. Then they are slid across stainless steel table tops to the new powered cutter, and subsequently the pieces move on trays to the check-weigher. This unit removes the cut cheese in rows, does the weighing, replaces the cheese in rows, and slides these into easy reach of the operator feeding the wrapping machine. No lifting is required.

Slabs are double wrapped, first with 40-gage Pliofilm, then with 300 MST (gage) cellophane. While these wraps

(*Turn to page 178*)

* In point is Tillamook's packaging mechanization that paid an investment return of over 200% (see FE Apr. '53, p. 90).



With corn skimming along each husking-inspecting-cutting line at 150 pm., Green Giant really—

Perks Up Cannery Performance

Handling is straight-through on improved units . . . Graphic central control panel "masters" the streamlined processing . . . Wastes are piped out for low-cost spray irrigation and production of silage . . . Pea setup being readied

HARVEY A. SCHEEL and JOHN V. ZIEMBA

Respectively Director of Engineering, Green Giant Co., Le Sueur, Minn., and Associate Editor, "Food Engineering"

What to do? Build a new corn cannery? Or renovate an old pea-canning plant so it could handle both vegetables?

This was the question facing Green Giant as demands for its quality-packed corn kept mounting. And a real poser it was.

But then smart-thinking company planners "went through the middle" for the solution—construction of a flexible new cannery to handle both these products as the pea-canning facilities in Ripon, Wis.

The factors had spelled it out: This establishment was in need of modernization . . . Nearby farmland was a good source of corn, following pea harvesting and canning . . . And employment of the well-trained, part-time workers could be extended.

Right off, two groups were happy about the project—Green Giant's local employees and farmers.

Corn: Initial outcome was installation of pacesetting corn-canning facilities. Plant construction started last April, and on Aug. 8 operations began. Notable here are the new streamlined handling techniques by which this firm has come up with a decided case-per-ton increase over its Rosendale (Wis.) cannery.

Peas: The highly advanced pea-packing setup is now in process of construction. Operations on this vegetable had continued in the original plant until the season's end on July 19. Then most of the advanced pea-processing equipment was moved over to the new layout, where it will play its part in the new project, designed to up production from 180,000 to 1,000,000 cases per season.

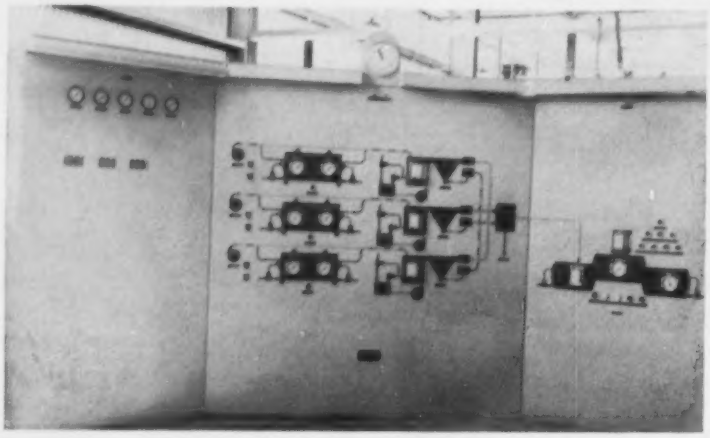
Check of the New Facilities

Marking the new cannery are the features for easy maintenance and better sanitation—with emphasis on workers' safety and comfort. There is special accent on disposal of processing wastes economically and efficiently.

As for the operational elements, a central key is the graphic control panel, permitting gage of the pulse of the entire production from one spot. Assigned is a quality-control technologist who assures processing of uniform canned vegetables.

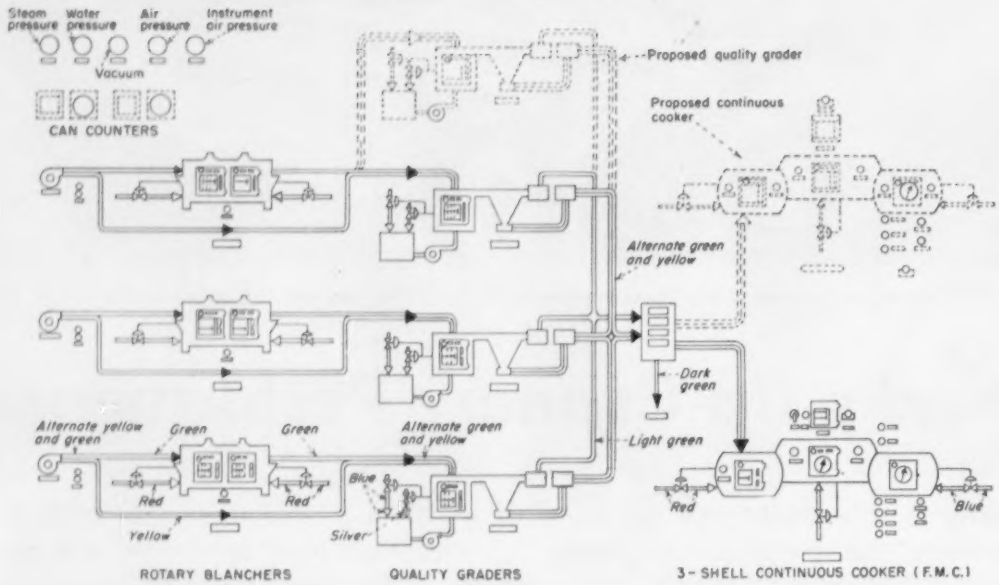
In order, let us check through the features of the plant modernization:

1. Single-story corn-process struc-



Working Points Of Control Panel

FROM MASTER STATION (left), operator easily and quickly checks processing activities. Compact board traces flow of product by colored "pipelines." Space is open for the additional units indicated in system drawing (below). Panel control clinches product quality.



ture (40 by 50 ft.), with corn distributing gallery.

2. Convenient office building (32x80 ft.) for plant manager, superintendent, field supervisor and fieldmen, weigher and truck dispatcher, maturity-evaluation laboratory, accounting and payroll departments, personnel director, and general offices.

3. A 400-ton-capacity corn-handling platform, with sufficient space for future expansion from 112x165 ft. to 112x235 ft.

4. Warehouse (195x205 ft.) for storing 650,000 cases of canned corn and peas. This is in addition to the two smaller pea-cannery warehouses with 180,000-case capacity.

5. Pea processing and canning building (40x70 ft.) with four mezzanines and an 80x80-ft. pea-handling platform (30,000-lb. capacity).

Stress on easy maintenance and sanitation brought selection of construction materials that are impervious to moisture, readily washed down with a hose, and require no painting.

With water the life-blood of a cannery, hard-to-maintain wooden facilities have been omitted. A 5-in.-thick, concrete floor was paved. And concrete walls extend 5 ft. from the floor. Remainder of the building is of aluminum sash and corrugated aluminum, fitted with rubber gaskets to prevent entry of insects or rodents. And there are aluminum window screens.

Decks above the processing floor are of metal, provided with raised, safety-type grids. Moisture-impervious metal was chosen to preclude dripping of water in the processing areas.

Plant is equipped with fluorescent fixtures, protected with transparent plastic shields to prevent any fall of broken glass into products. Light varies from 25 ft.-candles for general purposes to 82 for inspection. South-facing windows are of actinic glass, which transmits a satisfactory amount of sunlight but filters out heat rays and appreciably reduces the temperature inside the building during hot summer months.

Window sills are sloped to prevent workers from using them for temporary storage of tools and personal belongings. Roof is designed for minimum maintenance. It is flat-topped, constructed of 20-yr. bonded tar and gravel, and free of freeze-damaging downspurts (plant not heated).

Economically constructed warehouse is of reinforced concrete tilt-up walls, with roof supported by mill-type construction (timber post and ceiling beams). Omitting sprinkling, lighting, and heating facilities, cost of this warehouse is $3 per sq. ft. Instead of following the roof-deck principle (1-in. plank and 1-in. insulation), 2-in. tongue-and-groove construction has been employed, with

6 x 12's joists without need of insulation. And further economies are gained, since the 2-in. planks permit a 6-ft. span between the 6x12 joists.

Central Panel System

The outstanding central and remotely-located graphic-instrument panel (Graphitrol) gives more precise control and recording of key processes affecting the quality of peas and corn than heretofore. Installation of complete instrument-control facilities was jointly carried out by engineers of Green Giant, Taylor Instrument Cos., and Food Machinery & Chemical Corp.

Panel is located adjacent to the brine make-up room and near the pea-receiving platform so the quality-control operator can quickly regulate the flow of peas through blanchers—giving the more mature peas a longer, high blanch. This panel is sectional, consisting of wings attached at an angle to the central portion.

Left wing has gages for vacuum, steam, water, air, and instrument air-pressure, with cut-outs for subsequent installation of can counters. This section will also accommodate future accessories. Mounted on the remaining sections are graphic symbols for actual processes under control, laid out to permit schematic additions for another F.M.C. Sterilmatic and blancher-grader line.

Other sections can be added to cover future processing and equipment changes.

For one thing, a section is proposed for controlling and recording concentration of chlorine to be used for in-plant chlorination.

A feature of the panel is its light gray simulated-leather texture, with all basic symbols dark gray. Process flow lines are blue for water, red for steam, silver for brine, dark green for the pea line, and yellow for corn. Alternate yellow and dark green represent flow lines where both products are handled on the same line or by the same machinery.

Operating From the Panel

Three pumps can be started or stopped from the left of the middle section, and a green bull's eye in each pump symbol indicates whether the pump is operating. Some machinery symbols on this middle section merely have indicating lights, since for safety reasons certain units are not operated from the panel.

Operations of the Sterilmatic unit are controlled from the right wing. Alarms, selector switches, and indicator lights notify panel operator of process conditions.

And so, for the first time in a vegetable cannery, a quality-control operator runs the entire processing operations from one spot. Should any process get out of control, he immediately takes corrective measures, thereby maintaining production of more uniform quality products. Should out-of-control variations be of a minor nature, he notifies the foreman in charge.

Before this graphic panel was installed, key processes were instrument-controlled, but at individual stations—blanchers, gravity-separators, and 3-shell continuous cookers. Trouble was the difficulty of controlling, in time, other processes along the line when one "went out."

Mastering Key Units

Only peas go through the blanchers. Corn kernels by-pass them on their way to the quality graders.

Foolproof, automatic control of the three F.M.C. rotary blanchers, with minimum steam consumption and manual supervision, is assured through the Taylor dual-control system. This way, peas are neither over- or under-blanched—a quality safeguard against tough-skinned or mushy peas, cloudy liquor in canned product, and inaccurate performance of the quality separators.

Each blancher is started manually. However, there are vari-speed drives on these units, and their rate of rotation, or blanching time, will be controlled from the graphic panel. Pumps feeding peas to the blanchers are pushbutton-started from the panel.

Instruments automatically control and record temperatures at inlet and discharge ends of the units to insure uniform blanching under all normal load conditions. Peas, on entering, reduce the temperature of the blanch water. Immediately, the inlet controller admits, through a pneumatically operated valve, more steam in proportion to rate of product feed.

When the peas reach the middle or equalizing section of the blancher, they are thoroughly heated. And the controller at the discharge end maintains proper blanching by admitting steam through a pneumatic valve.

Precise and economical float-separation of mature and immature peas is attained in F.M.C. quality graders through automatic instrument regulation of brine density. The Taylor density control system employs a mercury manometer to measure brine pressure in a sight-feed bubbler. Changes in brine density are instantly detected by a recording controller that pneumatically opens, one at a time, water and concentrated brine valves (throttling type) to correct density.

Three-shell (pre-heater, cooker, and cooler) continuous cookers are recorder-controlled from the panel. Controllers pneumatically open and close steam and cooling-water valves. When running peas, the pre-heating shell is also used as cooker. Temperature of cans of corn, on the other hand, is brought up to 220 F. in pre-heater before going to the cooker.

Further Details

The gentler, streamlined handling of corn through highly mechanized machinery has stepped up production, giving more canned product per ton of incoming raw material.

Corn is fed into the cannery in a simplified manner, resulting in a significant reduction of bruised corn (FE Dec. '54, p. 105). It is unloaded from trucks onto a 112x165-ft. concrete apron. A specially designed tractor then gently pushes the corn into a 36-in.-wide rubber-belt conveyor running 1 ft. below the level of the 400-ton-capacity apron.

Corn is then transferred onto a 3½ x 150-ft. rubber-belt conveyor (on 14-deg. incline) that elevates it onto a horizontal rubber belt (3 x 125-ft.) in the distribution gallery. Here, an operator controls its flow through the entire cannery by manually operating, in series, hinged, metal "brush-off" gates feeding 16 metal husker chutes.

All conveyors, to this point, are hooked in series so that they can be regulated by the gallery operator to avoid break-downs. Operator walks on an open metal grill to observe fill in each of the 37-deg. inclined chutes, and he diverts flow of corn, as needed. Capacity of each chute (1 ton) is enough for 20-min. operation of a husker.

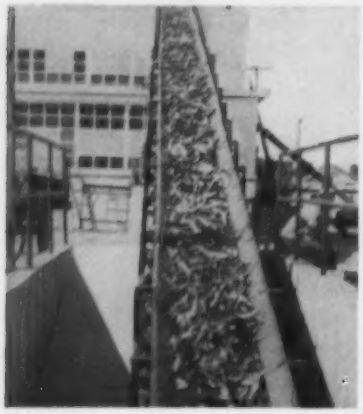
At each F.M.C. husker, two girls, one on each side of the machine, feed the ears, orienting them butt-endwise. Traveling forward, ears butted by a stationary knife drop onto 2-in.-dia. counter-rotating rollers that remove the husks. These fall onto a belt and go to the silage conveyor.

Husked ears continue onto a 14-ft. roller conveyor to receive their first inspection. Then as the ears enter a washing section, where four sprays jet water on them under 90-psi. pressure, rollers are livened by a rubber strip and the corn ears rotate as they move through washer and a second inspection.

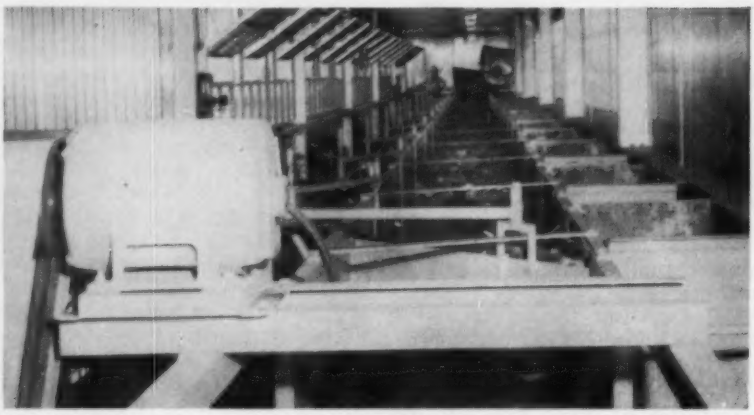
Inspectors finger-flick defective ears into a stationary trimming tray. And

Product Conveying, Waste Removal Are Pictured Next Page ➡

Whisking Product From Receiving Apron into Cannery ⟶



INCLINED conveyor lifts ears from apron to distributing gallery.



IN GALLERY, ears are belt-conveyed for shunting into metal chutes feeding 16 huskers. In-plant flow is controlled at this point.

roving trimmers move from tray to tray, trimming ears, as required, and replacing them on the roller conveyors.

Speedy Mechanical Cutters

Each roller conveyor discharges the twice-inspected ears onto a pair of small, lug-type chain conveyors feeding F.M.C. 3A cutters. A pair of rotating rubber rollers move each ear through a set of gaging fingers that pre-adjust high-speed rotating knives that dilate (like the iris of a camera) over the cob to remove the kernels. This pre-gaging prevents jam-ups at cutting knives and eliminates damaging of kernels.

The knives are counter-balanced so that centrifugal force keeps cutting blades on the contour of each corn ear. These blades neither cut too deeply into cobs or too far from cob surface (resulting in poor yield). Capacity of each cutter is 150 ears per min.

Cobs are belt-conveyed to silage conveyor. Kernels drop onto a 16-in.-wide rubber, standing-edge (¼-in. edge) belt that discharges them into a flume going through a series of rotating 1-ft.-dia. metal disks, spaced ¾ in. apart. Here, any large pieces of husk, cobs, etc., are removed by a notched, counter-rotating rubber roller, which discharges the wastes onto the corn-cob conveyor.

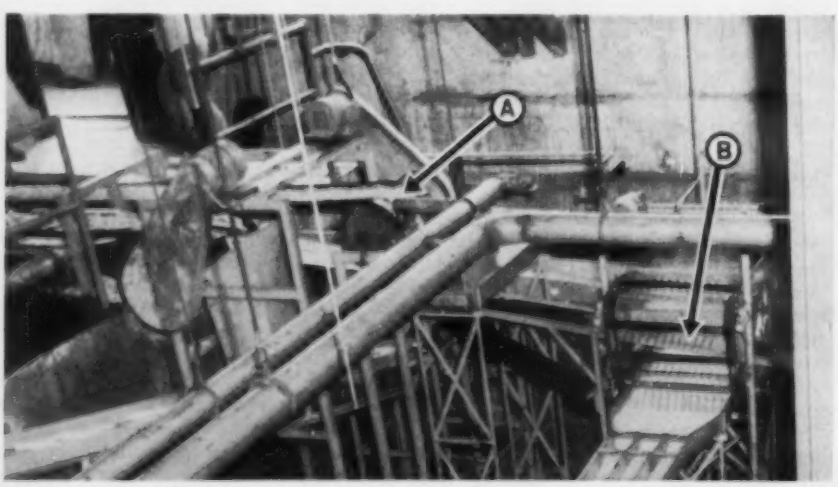
Kernels are now flumed to a chain-driven de-silker, with a series of 13 and 14 alternating spring-steel fingers (⅛-in. dia.) that pick up fine silk and husks. This material is removed from the fingers by sprays and goes onto the cob conveyor.

From here, kernels are separated into three flumes and then pumped through 4-in.-dia. aluminum tubes to Link-Belt vibrating screens (⅛-in. openings) for removal of hearts (broken kernels) and dewatering. Kernels are then discharged into gravity separators that float off silks, chaff, and damaged kernels.

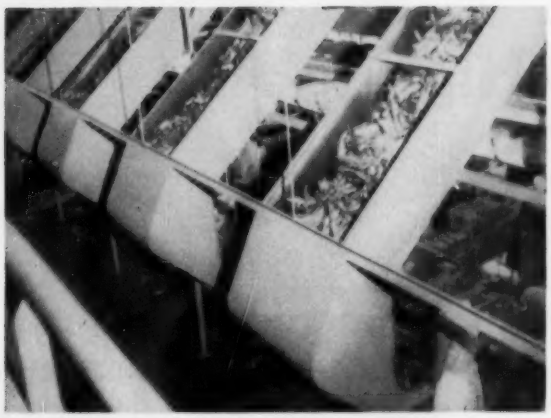
Good kernels are then water-jetted into rotary screen reels, which discharge into flumes flowing to another series of shakers for dewatering. Kernels go onto 2½ x 7-ft. standing-edge inspection belts. Rubber belts are salmon-colored to facilitate the work of the inspectors (two to a belt) in detecting any foreign materials.

Kernels are finally discharged (dry) to hoppers ahead of three 8-pocket, volumetric-type, rotary fillers, handling 150 cans (12 oz.) per min. Cans continue through can-lid clinchers and vacuum-sealers. Then they are discharged onto a rotary disk-type collecting table and cable-line carried to F.M.C. 3-shell continuous cookers.

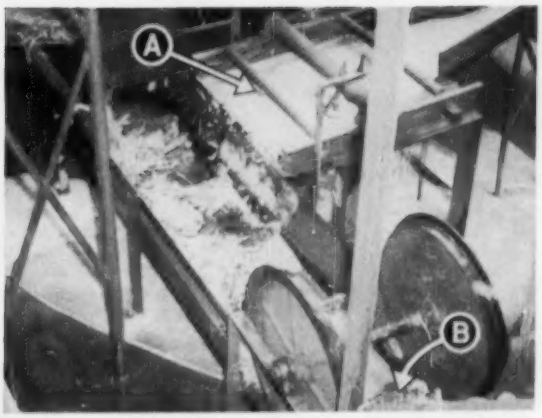
Special System Removes Husks And Other Matter ⟶



ROTATING DISKS (A) and de-soaker (B) first remove fine foreign matter from kernels, which go into three flumes.



EACH CHUTE holds full ton of corn. This is enough to keep a husking machine running about 20 min.



BITS AND PIECES from processing 'flume' to shaker-screen (A). Conveyor (B) takes solids to silage.

Cooled cans finally go through S.K. wrap-around-labelers, semi-automatic casers, and case-gluer-sealers.

Waste-Handling System

Efficient, economical handling of cannery waste is carried out in this manner:

Instead of using sewer lines, that so often prove difficult to clear when plugged up, waste water is flumed through, and from, production areas in gutters that are pitched to flow into one another. These gutters have been spotted below all processing machinery and inspection lines. Metal grills are installed over them, as needed, for safe walking and working in these areas.

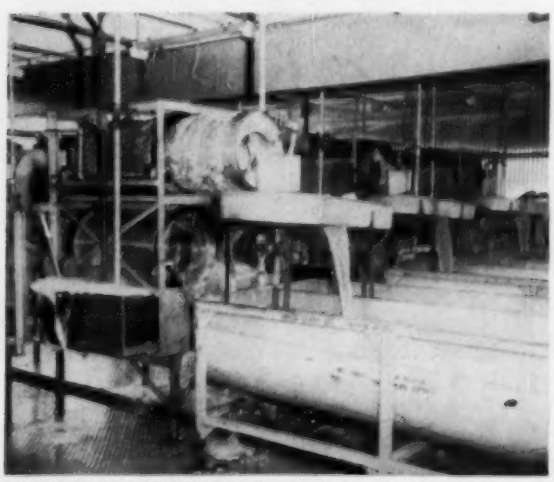
Advantage is taken of a 4-ft. natural ground slope, and all waste water flows by gravity to a 12x26x35 ft. separating pit. As water enters the pit, it flows over and through a 3x5-ft. Link Belt sewage-separator screen that removes solids. Waste solids discharge into a flight conveyor with other plant silage. Silage is elevated from the separator pit into farm-type manure spreaders that carry and distribute the silage onto a stack for curing and later use as animal feed.

60 Spray Heads

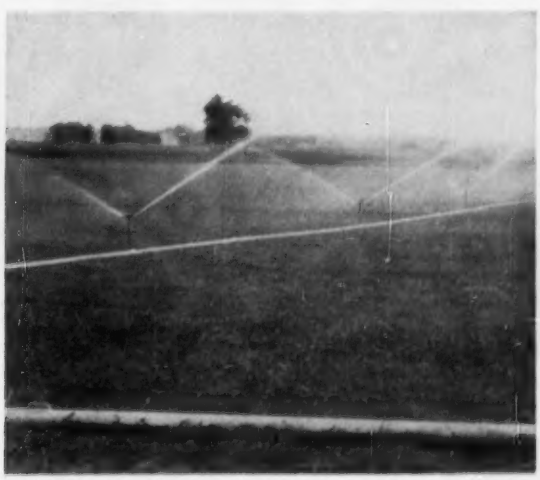
Waste water, after passing through the separator, flows into a 11x20x25-ft. pit. From here, it is pumped 1½ miles through an 8-in Transite pipeline to a 50,000 gal. surge reservoir located in the center of an 80-acre farm. From the reservoir, a gasoline-operated pump distributes the waste water through portable 6-in. aluminum irrigation piping equipped with 60 gpm. rotary spray heads. The entire farm has been planted to grass, and the overhead irrigation returns the water to the soil, providing economical waste disposal without obnoxious odors.

Waste material, such as husks, cobs, silk, and rejected corn, is continually removed from the building via belt conveyors. The main silage belt is 30 in. wide and continuous. It slides in a specially built concrete trough instead of on rollers. The belt is "lubricated" by water flowing between the concrete and belt.

Elimination of rollers and frames prevents objectionable accumulation and caking of waste. Main belt is washed clean before returning into the building. All conveyor frames and supports are built of round or square tubing to eliminate areas for waste buildup and make for easy cleaning. Entire plant can be cleaned in a matter of minutes after operations cease.



GRAVITY-SEPARATORS finish task of taking out any remaining pieces of husk, cob, or silk.



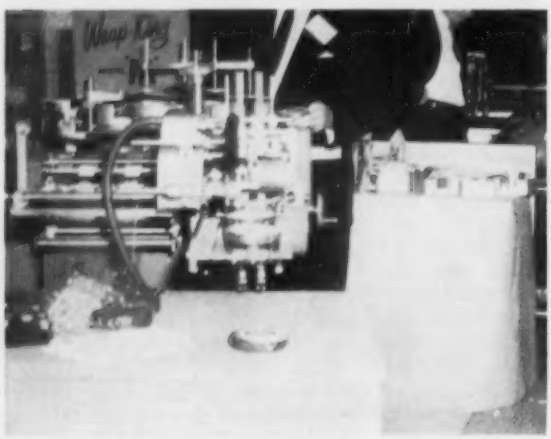
PUMPED 1½ miles from plant, waste water is utilized in spray-irrigation of grasslands.

Meat Show Highlights

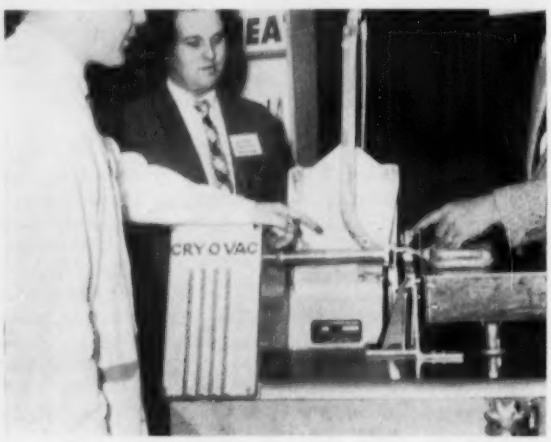
On view at well-attended AMI exposition in Chicago were newest cutting, forming, weighing, mixing, stuffing, packaging, and refrigerating units

9 PACKAGING UNITS:

Featured are wrapping, vacuum-sealing, coding, carton-forming, and multi-function machines



SLICED-LUNCHEON-MEAT wrapper produces tight, neatly wrapped packages at up to 80-per-min. rate. Handles Saran, cellophane, and Pliofilm. Feeds backing cards, applies thermoplastic labels over film folds, and code-dates labels. Changeover from round to square cold cuts in 10-min.—Wrap-King Corp., Holyoke, Mass. (90A)

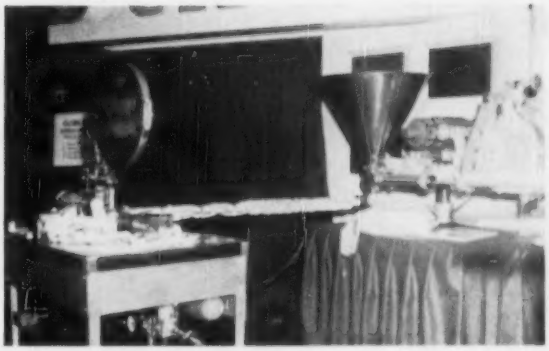


NEW UNIT vacuumizes, twists, applies clips, and trims Cryovac packaged meats in single operation. Has adjustable product table, controlled vacuumizing time, and pneumatic controls. Powered by ½-hp. motor using 115v a.c. Requires air pressures of 40 psi.—Dewey & Almy Chemical Co., Cambridge, Mass. (90B)

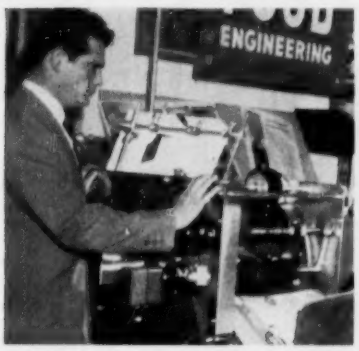
"FINGERS" (foot pedal-operated) on Tite-Wrap machine stretch vinyl envelope for easy packing of sausage chunks. Stuffed chunk is withdrawn from fingers, and rolled over slotted activator to be sealed with an activated thermoplastic label. Similar unit tight-wraps loaves, butts, boneless picnics, hams, and bacon squares.—The Visking Corp., Chicago. (90C)

NEW Saran Pre-Pak-It line takes conveyor-fed stacks of luncheon meats from 1 or 2 slicers. Operator cuts roll-fed Saran to sheets with electric wire cutter and folds sheet over meat with backing board. Package travels under adjustable first heat sealer that seals sheet to board, and second to seal label. Package then goes to code-dater.—Miller & Miller, Inc., Atlanta. (90D)

COMBINATION prepackaging line handles luncheon meats from two slicer-stackers, as well as franks. Slices go to two Saran-film wrapping stations. Hot air blowers shrink film to sides of package. Activated thermoplastic labels are applied and package code-dated. Two stations scale and cellophane-wrap 1-lb franks.—Great Lakes Stamp & Mfg. Co., Chicago. (91A)

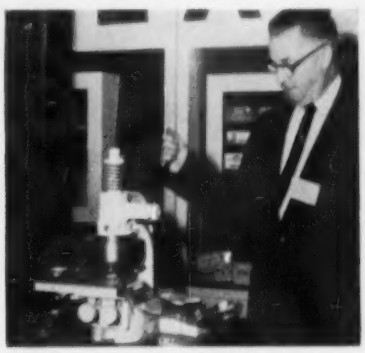


MULTI-FUNCTION UNIT fills liver sausage, sandwich spreads, and hot and cold processed cheese into 250-ft. casings that are clip-sealed and cut to length. Machine is hooked up to plunger-type filler (right). Air-powered unit gathers casing for filling in weights up to 1-lb. Casing is then ready for air- or vacuum-tight clipping. Rate: 20 per min.—The Globe Co., Chicago. (91B)



HIGH-SPEED, power-driven coder imprints 92 waxed bacon boards per min. Codes are made by steel type, set on wheels that turn to change codes. Has automatic counter.—Kiwi Coders Corp., Chicago (91C)

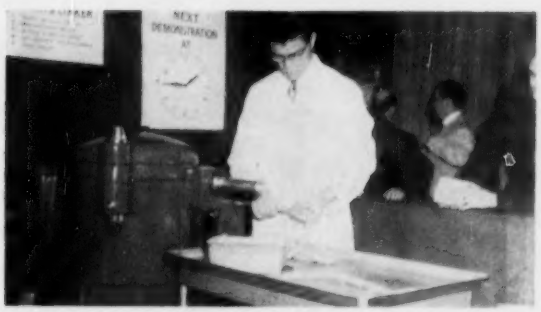
SEMI-AUTOMATIC carton former and printer is foot-pedal and air-operated to set up folder-style carton. Unit also imprints date, ingredient listings, and numbers.—Oster Tool & Die Corp., Chicago. (91D)



MANUALLY OPERATED crimping machine seals aluminum foil closures to foil pot-pie pans. Unit also designed to seal transparent plastic lids to foil pans.—Sutherland Paper Co., Kalamazoo, Mich. (91E)

2 ATTENTION ARRESTERS:

A combination sausage-filling and stuffing unit, and electronic remote-weight recorder

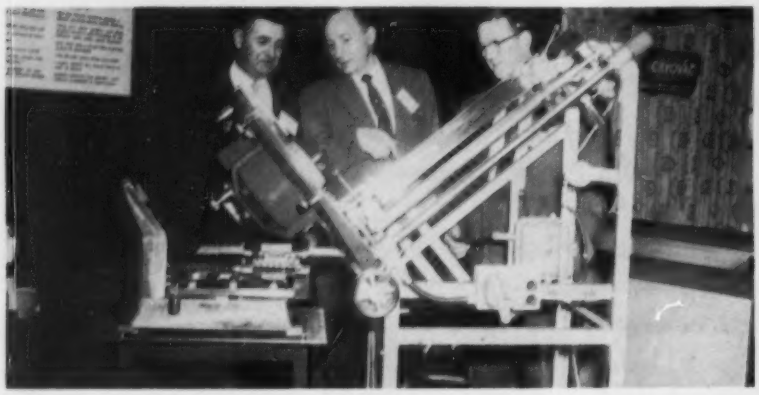


VERSATILE German-made hydraulic stuffer has built-in measuring cylinder and casing twister for linking sausage continuously or in separate chubs. Measuring cylinder is integral part of stuffer cylinder, and has separate motor and controls. Weight range: ¼-16 oz. Speed: 1 single measure to 150 automatic repeating measures per min. Twisting linker is part of metering system and operated by same motor. Speed: 1 twist at will to 150 per min.—The Globe Co., Chicago. (91F)

ADVANCED electronic unit records weights from remote point on adding machine tape and ticket. Photoelectric scanner is mounted on top of scale dial housing. Signals to control adding machine are from scanner, which transmits weight data through electronic counting and translating unit. Accuracy is offered by system that takes input signal directly from scale and converts to digital form on scale. Manufacturer: Toledo Scale Co., Toledo, Ohio. (91G)

6 CUTTING MACHINES:

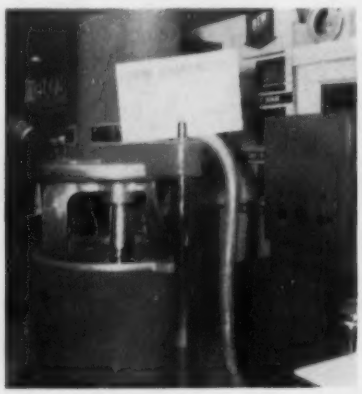
Latest in luncheon meat slicer-bagger, frozen meat cutter, belly converter and chop-mixers



MULTI-FUNCTION UNIT is built to slice, stack, weigh, and bag luncheon meats. Equipment operates at rates of 800-1,000 stacks per min., and groups 8 slices to a stack. In addition, machine is equipped with safety devices—Package Enterprises, Inc., San Francisco. (92A)

AUTOMATIC frozen-food slicer cuts in thicknesses of ⅛-1 in. Has safety features.—General Machinery Corp., Sheboygan, Wis. (92B)

CONVERTER cuts large bellies (20-25 lb.) at 900-per-hr. rate into preset width and thickness. Conveyor carries belly to rotary and oscillating horizontal knives.—Townsend Engineering Co., Des Moines. (92C)



VACUUM CUTTER and mixer is German-built, has speedy operation. Machine eliminates grinding steps and air pockets in meat emulsion.—The Globe Co., Chicago, was exhibitor of this unit. (92D)

GERMAN rapid cutter is of low cost. Reduces cutting time and eliminates pre-cutting of meats. Offers maximum yield and binding-quality with sausage meats. Exhibitor: The Globe Co., Chicago. (92E)

2 SCALERS:

Both designed to check "giveaways." One is built into bacon slicer, other is manually operated

ADVANCED bacon-slicing line is equipped for electronic weighing. Scale closes electrical contact as weight of sliced bacon reaches 1 lb. Balance tilts and closes circuit that sends electronic impulse to hydraulic unit to instantly stop feeding of bacon.—Albright-Nell Co., Chicago. (92F)

CATCH WEIGHT scale is designed for easy reading to avoid mistakes by operator.—Exact Weight Scale Co., Columbus, O. (92G)

3 MEAT FORMERS:

For automatic shaping of skinless sausage patties and for making various meat patties

MACHINE takes 4x4x30-in. pork sausage in loaf-feeder hopper. Piston forces meat through two sets of oscillating knives that cut into 1-oz. sticks at 22,000 lb./hr. Brown-'n serve sticks are packed 10 to foil tray.—Griffith Labs., Chicago. (93A)

BACON FORMER saves 2-3 more lb. per slab (otherwise diverted to trimmings or lard). Machine's top head descends to set stop as bacon is pressed to desired thickness. Side members shape it to length, width.—Dohm & Nelke, St. Louis. (93B)

FLEXIBLE UNIT, hooked up to stuffer, screw feed, or meat pump, forms meat patties. Also interleaves them with roll-fed waxed paper, and stack-counts preset number. Rate: 12,000/hr.—Package Enterprises, Inc., San Francisco. (93C)

2 NEW REFRIGERATION UNITS:

Featured are low-weight and hydraulic systems

STANDARD auto generator on unit supplies d.c. current to blower motor, thus no connection is needed to truck's electric system. Compressor is powered on the road by a flexible shaft belt-driven from crankshaft pulley through electric clutch. At plant, compressor is driven by motor plugged to electric outlet. Compressor-condenser is attached to chassis frame (under body), and cooling unit (evaporator coil and fan) is mounted inside body near roof. Weight is 422 lb., size: 2 hp.—Tranter Manufacturing Co., Lansing, Mich. (93D)

PROTOTYPE of refrigeration unit (soon to be available) is powered on the road by truck engine, which drives a hydraulic pump. Latter runs hydraulic motor in unit. Pump may be installed under the hood (belt drive), or attached to power takeoff (direct drive). Pump drives compressor at constant speed—delivering full refrigeration capacity—whether truck engine is idling or at full throttle. Weight of hydraulic-electric models is under 450 lb. Displayer: U. S. Thermo Control Co., Minneapolis. (93E)

LIQUID SPRAY DISPENSERS

EQUIPMENT, developed by Magnuson Engineers, San Jose, Calif., was set up to liquid-spray items packed into cartons, or trays belt-conveyed to closing and overwrap machines. Carton or tray flap interrupts photo-light beam to automatically open dispenser head for fan-spraying. Liquid is pumped from plant's supply system to liquid-level tank (adjustable to optimum hydrostatic head). Overflow from tank returns to plant system. Exhibitor: Morton Salt Co., Chicago. (93F)

Circle Key Numbers on Reader Service Card

Dairymen Scan Improved

ON PROGRAM at Milk Industry Foundation sessions were (left to right): H. A. Spillman, R. J. Speirs, A. E. Geiss, W. H. Chadderdon, F. J. Babel, and R. J. Quirie.

MILK SESSIONS

Shorter work week • CIP pipelines—glass and stainless • Cultured products

HIGHLIGHTING the Plant Section of the recent 48th Annual Convention of the Milk Industry Foundation in St. Louis were pointed discussions of such subjects as efficient operations, improved sanitation, and better cultured products.

5-DAY OPERATION

Overall costs, including capital expenditure for added work space and equipment, must be weighed against payroll savings when considering a switch to 5-day milk plant operation, in the opinion of C. A. Peterson, Country Club Dairy, Kansas City, Mo.

In the shift from a 6- to a 5-day week in his company's two plants—they are now down on Wednesday and Sunday—procurement did not present much of a problem.

Solving Space Problems

Due to shortage of raw storage facilities and floor space, however, plant problems were more involved. Additional raw storage was provided by installing tanks on a steel framework at second floor level with only their fronts extended into the processing area. This cost only 8 in. of floor space per tank.

Loading refrigerated delivery trucks in afternoon of day preceding shutdown solved the milk-cooler size problem. And increasing stocks of bottles and cases by about 50% provided for these items.

Now, production on Monday, Tuesday, Thursday, and Friday is about 1¼ times that of sales, with Saturday somewhat smaller. Down days provide opportunities for maintenance without overtime.

AUTOMATIC CIP

Results of one year's operation of an automatically controlled cleaning operation on cold milk lines were discussed by L. F. Krehbiel, Adohr Farms, Los Angeles.

The automatic cleaning unit was designed with three 125-gal. tanks—one for rinse water, one for detergent solution, one for sanitizer. Lines (2½ in. dia.) have welded joints for all straight runs, elbows with Tri-Clamp fittings, and Hycar gaskets at turns. Brackets are made of ½-in. stainless rods, with bands around pipes, and in most cases they are attached to the equipment. Lines slope ¼-½ in. per ft.

In operation, automatic unit is attached, by means of two hoses, to center of circuit to be cleaned. Tanks are filled with water, and detergent and sanitizing agents are added to respective tanks.

Pushbutton Control

Operator then presses starter button and machine goes through entire cleaning cycle, then shuts itself off. Rinse water is discharged to the floor, while detergent and sanitizing solutions are returned to respective tanks for recirculation.

Steam is actuated by a solenoid valve and enters solution in manifold at time of usage. Filtered air is solenoid-controlled and operates when pump is off for purpose of blowing liquid from lines. Rinse dump-valve opens after each cycle is completed to permit air-blown solution to run onto floor.

Thermometer, with bulb in return line, records time of cleaning cycle and temperature of solution. A 1-hp. pump provides solution velocity of 8 ft./sec. An air-controlled cold rinse valve opens at the start of cleaning to enable flushing of milk from lines.

Each part of the system is controlled by a sequence timer placed in a gasketed, waterproof stainless box. It comprises a clock and series of disks that are set to

(Continued on second following page)

Products, New Techniques

SPEAKERS at the ice cream production and laboratory sessions included (left to right): D. G. Sherman, W. A. Kreinke, W. F. Shipe, H. G. DePew, I. A. Gould, and J. H. Erb.

ICE CREAM TALKS

Efficient production • Cleaning-in-place • Advanced processing • Ingredients

METHODS of advancing efficiency and improving product quality were given top billing in the practical Production & Laboratory Section of the recent 51st Annual Convention of the International Assn. of Ice Cream Manufacturers, held in St. Louis.

EFFICIENT PLANNING

Proper planning and supervision are the most essential jobs of the ice cream production manager, according to J. Hoffman Erb, The Borden Co., Columbus.

It is important to plan because this charts in advance the course of work so that interruptions and obstacles are minimized.

Schedules should be made up at least a week ahead. And sequence of running flavors and different size packages, also amounts of each, should be well worked out.

Further, it is best to arrange equipment for quick shifting of operations so freezers, fillers, etc., can be kept running constantly throughout the day. And when changeovers occur, everyone should "be in the act."

Moreover, organization and direction of employees are extermely pertinent relative to productivity. By informing the personnel of management goals, timing their coming on the job, and staggering their rest periods, efficiency can be greatly increased.

A great deal depends on the caliber of "middle management", and its establishment as part of the management team.

It should be supplied with actual records and an opportunity to study a breakdown of results. When given the right encouragement and opportunities, middle management can make the difference between successful operation and one that just drifts along.

CLEANING IN PLACE

The most challenging application of CIP is in the field of spray-cleaning storage tanks and batch heating and pasteurizing vats, according to F. M. Skelton, General Ice Cream Corp.

Used here is a ¾ in. stainless steel hollow ball perforated with 50-75 holes varying in dia. 1/16 to 3/32 in.

Holes are drilled in such a way as to direct the spray against upper section of tank interiors, relying on the flow of solution to clean lower surfaces. Closed vessels lend themselves especially well to this type of spray cleaning.

Tank is first rinsed, with removable parts disassembled and either manually cleaned or placed in bottom of tank. Then cleaning solution is made up in the tank and circulated by a pump through the spray ball for a pre-determined period. Tank is then rinsed, reassembled, and sterilized.

Vats up to 4,000-gal. capacity are being cleaned successfully with spray balls. But this is not true of the tanks and tank trucks that run 20 ft. and more in length. For these, rotating and stationary jet sprayers appear to be most satisfactory.

AUTOMATION SEEN

Missing link in control equipment needed for the completely automatic dairy-products processing plant is an in-line method of determining fat and total solids content of dairy products.

This is the opinion of D. A. Sieberling, Ohio State University. Citing availability of automatic units for measuring and controlling flow, liquid level, moisture content, density, pressure, temperature, and pH, he maintained that the main stumbling block to automation in the dairy field was the attitude that "it will not work here."

He visualized the automatic ice cream plant as requiring: (1) Continuous mix-making procedures, (2) more

(*Continued on second following page*)

What's *Your* Ice Cream I.Q.?

—To get an idea, just sharpen your pencil and run through these 20 questions (sprung on members of the Ice Cream Production & Laboratory Council at the IAICM meeting in St. Louis).

Merely underscore what you believe to be the correct statement in each one. Then when you're finished, consult the answers (printed upside down at the end).

For every one you get right, give yourself 5 points (or fractions thereof on partial answers to the multi-questions).

We think any score over 75 qualifies you as a capital-E Expert. And if you should actually tally 100, we'd call you a Downright Genius.—The Editors.

1. The principal quality problem associated with storage of frozen cream is: (a) fat concentration, (b) leaky containers, (c) onset of oxidized or tallowy flavor, (d) heated flavor.

2. Principal obstacles confronted in blending corn and sucrose syrups (Note: Check two answers here), are: (a) discoloration, (b) off-flavor development, (c) thorough mixing, (d) non-sugar solids present in corn syrup, (e) differing osmotic pressures of the two sugars with respect to bacterial growth.

3. Use of honey in ice cream is limited by which two of the following factors: (a) color, (b) source (crop), (c) flavor, (d) levulose concentration, (e) presence of non-sugar solids.

4. Air contamination of ice cream mix during pasteurization has been shown recently to be related especially to: (a) phosphatase test, (b) acidity development, (c) coliform count, (d) thermophile count, (e) psychrophile contamination.

5. In using processed, hermetically-sealed pineapple, which one of the following factors least affects quality of the finished pineapple ice cream: (a) sugar penetration, (b) fruit particle size, (c) acidity, (d) syrup Brix, (e) variety.

6. Which of the following modified Babcock tests use no concentrated sulfuric acid: (a) Pennsylvania method, (b) Schain test, (c) Minnesota test, (d) "BDI" (Sager) test.

7. Cane sugar differs from beet sugar in: (a) Freezing point depression, (b) optical rotation, (c) solubility, (d) no difference.

8. The most nearly colorless sucrose syrups are obtained by the following re-

MILK (Cont'd)

operate the various valves during the cleaning cycle, which proceeds as follows:

Operation	Minutes
Cold rinse	3
Air	2
Hot detergent	20
Air	2
Hot wash	20
Air	3
Cold rinse	3
Air	2
Sanitizing	3
Air	2
Total	60

Hycar gaskets were initially changed after 90 days. Then they were left in 120 days. And currently they are undergoing a 150-day test. Lines are treated with acid every 60 days.

GLASS LINES

"Even if the economic aspect of in-place-cleaning of pipelines were completely disregarded, this method would still justify itself on the basis of better results than are possible with hand cleaning."

So declared Dr. A. C. Fay, H. P. Hood & Son, Boston, in a discussion of his company's 17-yr. experience with almost a mile of glass piping.

Remarking that CIP has made a difficult job simple and easy, he pointed out that good results could be obtained 365 days a year with little or no qualifications, and at a considerable saving in cleaning costs.

Following a careful study of gasket life, a systematic replacement program has been adopted, based on half the average life. At present gaskets on cold milk lines are replaced annually and those on the hot lines at 3-month intervals.

Sterilization of cold milk lines following cleaning is with 200 ppm. chlorine solution. And hot water (entering at 205-208 F., leaving at 190 F.) is used on lines that handle pasteurized products.

An in-place-cleaning program was stated to serve its best purpose in long lines having few side connections and valves. In many small plants, material savings are not possible.

COTTAGE CHEESE

Five "secrets" of low-cost production of cottage cheese, according to W. J. Chadderdon, Arcade Farm Dairy, Buffalo, are: Farmer education, top quality milk, proper methods, correct use of equipment, and quality control.

And four specific cost reducers named were: Fortification of skim milk with high-quality low-heat powder, use of acidified and chlorinated wash water, employment of a good mechanical mixer to blend the cheese and cream, and a good packaging machine.

With reference to the latter Mr. Chadderdon pointed out the importance of uniform filling, citing a plant packaging 10,000 lb. per day running ½ oz. over on each package. This represents a loss of 5,000 oz., or approximately $50 per day.

SLOW CULTURES

Maximum value of a lactic culture activity test is obtained when carried out under conditions simulating actual plant conditions, according to Dr. F. J. Babel, Purdue University.

Discussing effect of variations in rate of acid production and flavor development on manufacture of cultured buttermilk, cream, and cottage cheese, he noted that these could be slight or very pronounced, and may occur abruptly or take place over a period of time. Flavor may be determined organoleptically or by biacetyl content.

Tests for acid development include: Culture activity and inhibitory actions of such substances as bacteriophage, antibiotics, and bactericides. Selection of methods depends on use to be made of the culture.

Activity tests should be made at 86-90 F. where maximum acid development occurs and, when possible, in milk used for manufacturing purposes.

For comparison, an activity test can be conducted in a medium of reconstituted milk (10g. dry skim milk + 100g. distilled water) heated to 185 F. for 30 min., inoculated with 1 or 5% culture, incubated at 86 F., and titrated at 2-hr. intervals for 4-6 hr.

As for inhibitory substances, bacteriophage can be de-

(Turn to page 161)

finement processes: (a) affination, (b) centrifugation, (c) ion exchange columns, (d) bone char filters.

9. Direct-consumption liquid sugar from off-shore areas is now available in the U. S. True. False.

10. Procedures for the chemical analysis of dairy products obtain legal recognition when published by: (a) Amer. Public Health Assn., (b) Int. Assn. Milk & Food Sanitarians, (c) Assn. Food & Drug Officials of U. S., (d) Assn. of Official Agricultural Chemists.

11. The ice cream industry uses how much of the total strawberry crop of the U. S. in all types of strawberry packs? 20%, 50%, 10%, 60%, 32%.

12. The contaminant of frozen fruits which gives the most troublesome **routine** regulatory problem is: (a) thermophiles, (b) psychrophiles, (c) enterococci, (d) coliforms, (e) Salmonella.

13. True fruit concentrates are now available to the ice cream industry as a result of development of: (a) low-temperature evaporation, (b) chemical synthesis of fruit volatiles, (c) dehydration, (d) volatile essence recovery through flash heating.

14. Mechanical cabinets were first advertised in the ice cream trade journals in: (a) 1919, (b) 1920, (c) 1923, (d) 1930.

15. Imported edible tree nuts are subject to tariff restrictions. True. False.

16. Pecans are almost exclusively supplied from domestic sources. True. False.

17. The 3A Sanitary Standards are voluntary minimum standards formulated by representatives from three groups—The Int. Assn. Milk & Food Sanitarians, U. S. Public Health Service, and one of the following: (a) IAICM, (b) DISA, (c) Amer. Dairy Assn., (d) Amer. Dairy Sci. Assn., (e) Dairy Industry Committee.

18. The National Sanitation Foundation is sponsored by: (a) Michigan State College, (b) Dairy Industry Committee, (c) Univ. of Michigan, (d) National Research Council.

19. The USPHS recommendation for pasteurizing ice cream mix by the Vacreator method calls for which one of the following heating exposures: (a) 200 deg. F.-no hold, (b) 180 deg. F. for 10 min., (c) 194 deg. F. for 1 sec., (d) 175 deg. F. for 25 sec.

20. The U. S. Standard for pure vanilla extract is defined as "containing in 100 ml. the soluble matter from: (a) 13.34 oz., (b) 10g., (c) 50g., (d) 25g., vanilla beans."

Answers

1. (c) ; 2. (c) & (e) ; 3. (c) & (d) ; 4. (c) ; 5. (e) ; 6. (b), (c) & (d) ; 7. (d) ; 8. (d) ; 9. T ; 10. (d) ; 11. 20% ; 12. (d) ; 13. (d) ; 14. (c) ; 15. T ; 16. T ; 17. (e) ; 18. (c) ; 19. (c) ; 20. (b).

ICE CREAM (Cont'd)

highly mechanized materials handling systems, (3) freezers equipped with automatic overrun controls, (4) mechanized packaging operations, and (5) mechanized hardening systems.

HTST PROCESSING

Observations of ice cream mixes pasteurized at temperatures from 200 to 260 F. in a Rosewell heater, and of ice creams made from them, were reported by W. S. Arbuckle, University of Maryland.

Results showed some stabilization effect in the fresh mix and in ice cream when fresh and in storage. This enabled reduction of one-quarter to one-third in amount of stabilizer needed for satisfactory results.

Keeping quality of the mixes varied directly in relation to processing temperatures. And body and texture of ice-cream increased in smoothness as temperature of processing of mix increased.

HIGH-SERUM SOLIDS

There is need of a good-flavored, low-lactose skim milk powder that can be used to raise the serum solids content of ice cream mix by 2-3%. This was pointed out in a paper prepared by C. D. Dahle, Pennsylvania State University, retired, and presented by W. F. Collins, Swift & Co.

In a review of the increase in serum solids in ice cream mixes, the call for still higher percentages was cited and present limitations were reviewed.

Reasons for higher percentages include: Increased sale of ice milk and low-fat products, development of the dietetic ice creams, consumer demand for heavier body and better texture in ice cream, and utilization of surplus serum solids.

Present limitations are: Sandiness due to crystallization of lactose, salty taste, condensed or cooked taste, and soggy body.

NON-DAIRY PRODUCTS

Quality of non-dairy ingredients used in ice cream has not received as much attention as it deserves or requires, declared H. F. DePew, National Dairy Products Co., N. Y.

Mentioned were seizures by FDA of nuts and nut products, candy, chocolate, and fruits for such adulterations as moldy, rancid, and decomposed products, insect parts, and molds.

In the case of liquid sugar, lack of uniformity, variations in color and flavor, and turbidity are trouble-causing defects. And with corn syrup, the difficulties usually result from overheating. Further, masking of delicate flavors, such as vanilla, can result from excessive use of corn syrup solids.

Too much sugar, undissolved sugar, extraneous matter, execss water, and poor-quality fruit are outstanding defects of strawberry packs. For example, berries that were supposed to be packed 3 + 1 were found to average closer to 2 + 1 and, in many cases, undissolved sugar was found in the bottom of the 30-lb. tins. Strawberry caps, leaves, and weeds are the most comon extraneous matter, while moldy and rotten berries are the greatest factor in lower quality.

Another non-dairy ingredient that needs watching is nuts. Here, extraneous materials, particularly shells, poses the outstanding problem, although rancidity and insect infection also must be accounted.

Cocoa and chocolate are susceptible to rancidity and high mold counts. And cartons, stabilizers, and emulsifiers have produced off-flavors in ice cream.

Much of the blame for these defects was placed on poor housekeeping in the producing plants. By inspecting these plants, checking the ingredients as received, and making bacteria, yeast, and mold counts on them, ice cream plant operators can raise the quality of their non-dairy ingredients.

FRUIT INJECTION

A method of preparing fresh-fruit injection materials that offer consumers the most tempting and satisfying fruit ice creams was described by W. A. Krienke, Florida Agricultural Experiment Station.

This method requires no heat treatment of fruit itself, and it results in an injection material that retains excellent quality at 0 F.

For best results, fruit must be ripened to its maximum flavor content, including additional ripening

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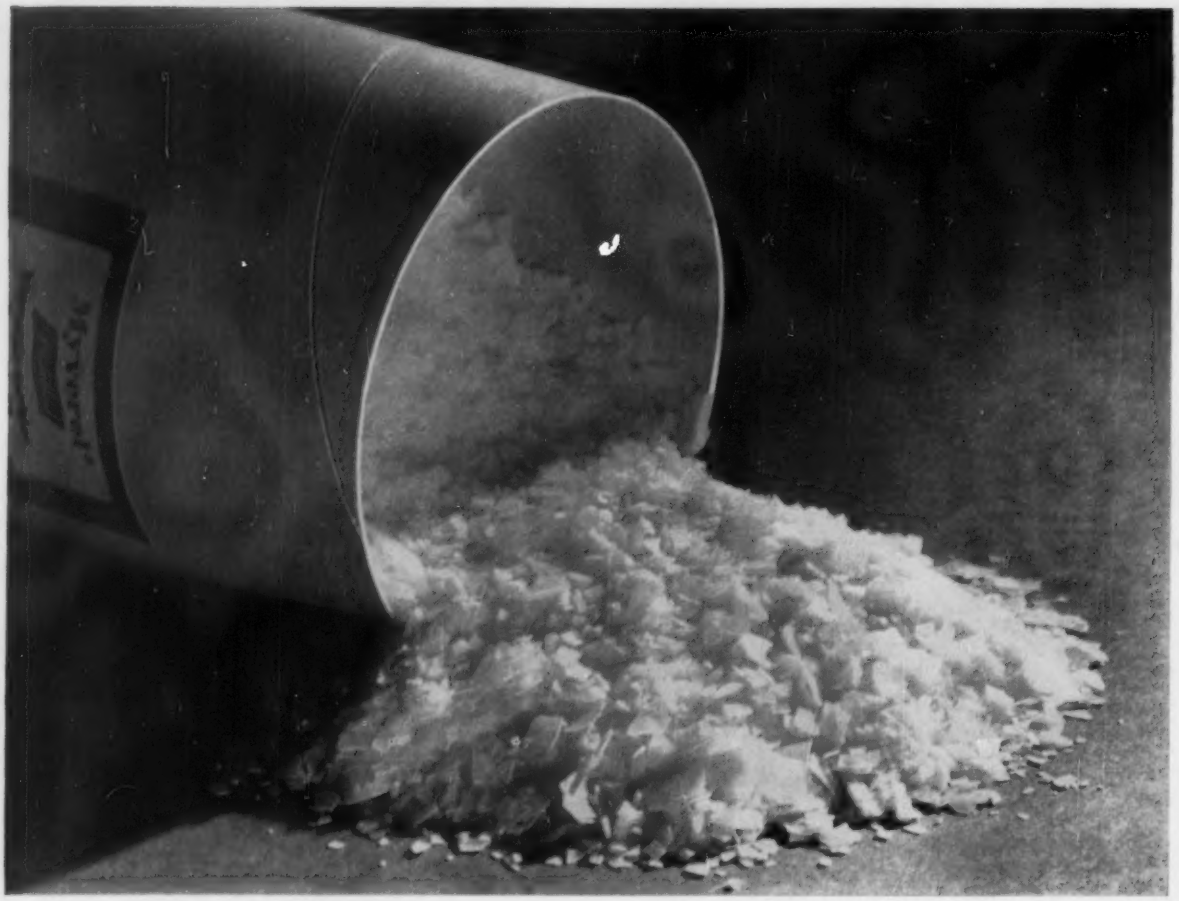


Help for the conscientious

This will introduce a new Myverol® Distilled Monoglyceride—*Type 18-06*. It's for the man who has an "all-vegetable" label to live with. No longer need he deny his product those wonderful texture effects obtainable with *Type 18-00* in shortening, baked goods, margarine, icing, and frozen desserts just because the tiny amount of it he would need is made from hydrogenated lard.

Now he can get a flake-type genuine *Myverol* monoglyceride, with all the advantage it means in economy, purity, and effectiveness—but made from hydrogenated vegetable oil and U. S. P. Standard glycerine. The only preservative is a trace of citric acid, which confers excellent stability.

Distribution of fatty acid chain lengths is not exactly the same in the new *Type 18-06* as in *Type 18-00*, the *18-00* tending to run a trifle lower in saponification number. Iodine value of *18-06* is a trifle higher. Both congeal at about 68 C. Both contain no less than 90% active mono, not counting 2-monoglycerides, which are active too.

Despite the close similarity, it is advisable to run some experiments on your products with *18-06*, even if you are already very familiar with *18-00*. If you're not, it's even more advisable.

For generous samples and helpful advice, write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York, Chicago, and Memphis • W. M. Gillies and Company, Los Angeles, Portland, and San Francisco • Charles Albert Smith Limited, Montreal and Toronto.

distillers of monoglycerides made from natural fats and oils

DPi

Also . . . vitamin A in bulk for foods and pharmaceuticals

Distillation Products Industries *is a division of* **Eastman Kodak Company**

From hoisted tub
600 lb. of coconut mix

From candy pan
30 lb. of cream mix

Out come the "stickies," slick as a whistle . . . It's done with—

New Quick-Release Coating

Confectionery, bakery, and meat products slip easily from pans, tubs, molds . . . Saves time and labor, improves food's appearance . . . No more whack-denting of containers

FE STAFF

Getting right down to points, it becomes clear that sticky foods pose fully five disadvantages in processing—

1. **They delay production.**
2. **Lower yields.**
3. **Drop quality.**
4. **Add to maintenance.**
5. **And fatigue workers.**

To Curtiss Candy Co. of Chicago, this was a challenge. It sought a remedy. And today it has cut down on the time-consuming task of removing creams, nougats, and coconut centers from holding pans and tubs.

Specifically, it applies a new releasing agent—a homogenized mixture, consisting of vegetable oil, stabilizer, emulsifier, and antioxidant (made by Stuart Hale Co., Chicago). Put on the pans and tubs prior to filling, this agent, which is liquid at room temperature, lowers the surface tension, thus enabling subsequent easy and quick release of the candy materials.

Further, the treated pans and tubs are much simpler to clean. And, in most cases, they can be used twice before need to re-coat.

The 30-lb.-capacity metal pans get an inside brushing of the agent in the cream department. Then the cream discharging from a Werner beater falls into them, and 28 pans go on a portable rack. Next, the cream from these pans is dumped into agitator-type steam-jacketed kettles.

This technique eliminates the old difficult manual chore of whacking the heavy pans against the rim of a cooking kettle in order to remove the confection. Accordingly, the pans are no longer dented and warped. And now, rims of kettles do not need to be reinforced with ¼x3-in. metal stripping.

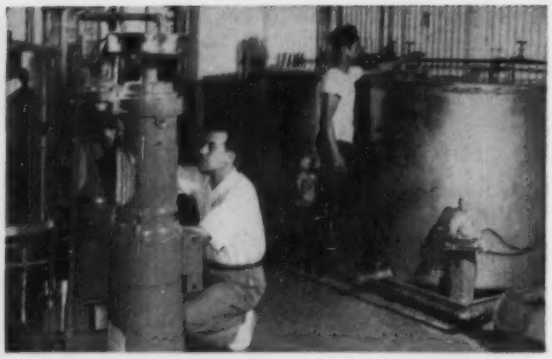
The new agent has also worked remarkably well with nougats, which are notorious for being very difficult to release. At Curtiss, nougats are stored in coated pans of 25-lb.-capacity. In this operation, six pans are loaded into a portable rack.

Greatly simplified, too, is the job of transferring coconut mix. This material goes from 600-lb.-capacity metal tubs into a horizontal screw conveyor. And the latter feeds a stainless steel band conveyor going to bar-forming machines.

Formerly, this candy mix was laboriously scooped by hand from tubs into the screw conveyor. Now, however, the agent-coated tub of coconut mix is automatically raised by a chain-hoist and then tilted so that the mix easily

(*Turn to page 162*)

TRIMMING BELT (rear) for the papaya and guava fruit discharges into pulper (right). Nectar is then pumped to the finisher (left foreground).



GUAVA, alone, is pumped from finisher to mills (left), reduced to a smooth, inseparable liquid, then pumped to mixing-storage tanks (right).

Here's Processing Picture On Hawaii's Exotic Fruits

A. A. SMYSER
Special FE Correspondent, Honolulu, T.H.

There's now a rising interest in the commercial possibilities of Hawaiian tropical fruits—papaya, guava, and passion fruit for nectars and frozen products, including ice cream bases and a number of other items.

Hence, specific attention is drawn to the fruit processing methods.

With the exception of a milling operation, the canning processes for both papaya and guava are identical and the same unit operations are employed.

Both fruits first are fed onto a trimming belt. Here, papaya is cut and trimmed, and guavas sorted for quality. Papaya waste is sold for pig feed. Poor quality guavas have no use other than as compost.

The trimming belt discharges the fruit into a pulper and the resulting liquid is pumped to a finisher (both Food Machinery Corp. units). Screens in these two units remove seeds, skin, and pulp. Papaya juice is pumped from the finisher to a stainless holding tank. Guava juice is pumped to the two Morehouse Industries Speedline mills.

These mills have a rated capacity of 100-plus gph. They are of stainless steel at all product-contact points. Power is provided by 10 hp. motors that drive the spindles at 3,600 rpm.

Homogenize as Well as Grind

Of the attrition type, these mills, use Carborundum stones, which are adjustable to fine tolerances. They provide a homogenizing as well as a grinding action, producing an extremely smooth puree, eliminating any of the guava's gritty factor and making a product that does not separate when mixed with other ingredients.

This nectar is then pumped to a holding tank. In this agitator-equipped unit, water, sugar, and 0.2-0.3% of citric acid is added to the guava nectar. The additional citric acid reduces the pH of the product and permits canning without pressure cooking.

Elimination of this heat treatment serves to retain the vitamin content and the product's fresh flavor. Artificial coloring is added to the guava, although none is needed for papaya.

The nectars are next pumped through a tubular heat exchanger for flash pasteurization. Papaya is held in this unit (it measures 80 ft., by 1 in. dia.) for 3-5 sec. at 205 deg. F. Guava is held for the same time, but at 180 deg. F.

From the pasteurizer, the finished nectars are pumped to a filler and thence to a can closing machine. Cooling is carried out in a reel-type cooler.

Only two unit operations are involved in processing passion fruit.* It is first fed to a chopping machine, which cuts the hard core and inner sack containing the seeds and juice. This macerated product is then fed to a centrifuge in which the juice is separated from the pulp and seeds.

Except for that portion which is used for blending with papaya for nectar, this product is benzoated, packed in 50 gal. drums, 5-gal. paper containers, or No. 10 cans, then frozen.

The papaya chunk process, still being experimental, has been done largely by hand. The product is, however, peeled on a modified apple peeler. Seeds are then removed, and chunks are cut and filled into cans. A heavy syrup is then added, the cans are sealed, and the product is heat-sterilized.

* For detailed articles relative to passion fruit processing and uses, see FE Sept., 1955, p. 94 and FE July 1952, p. 94.

Island Operations, Improvements, New Factors

Estimated as totalling up to $750,000 for 1954, Hawaii's canned nectar business is being viewed as a growing factor for bolstering the Islands' economy.

Probably the largest present firm is one with the striking name of Kaaawa Farm, Ltd. (pronounced "Ka-ah-ah-va"). Headed by G. Y. Bennett, it has now expanded to the level of $300,000 gross sales.

Kaaawa turns out canned papaya, papaya-pineapple, papaya-passion fruit, and guava nectars, and it freezes papaya puree, guava puree, and passion fruit juice. The latter are benzoated to less than 0.3%. Kaaawa also cans papaya chunks, a product enthusiastically received by initial U. S. Mainland buyers. Production on this product is still limited, although new equipment is being devised to increase it.

The idea of canning the nectars isn't new. Today, however, Hawaii is seriously concerned about its heavy economic reliance upon sugar, pineapple, and tourists. Hence, the Territorial Government is watching the new fruit developments with interest and lending encouragement.

There is ample papaya and guava on

(Turn to page 188)

INTERVIEW *with frozen storage plant executive* **ALBERT I. RIS**

How Berkshire Frosted Foods solved these 5 major cold box problems with Armorply

Unit eliminates crowding, dampness, loss of cold, vermin, high power costs

Q. What were you looking for when you first considered Armorply for your frozen storage plant?

A. We needed a low-cost, leakproof, verminproof, sweatproof unit that would hold the temperature at 0° and could be expanded for future growth.

Q. That's a big order—didn't the storage space you were using have any of those advantages?

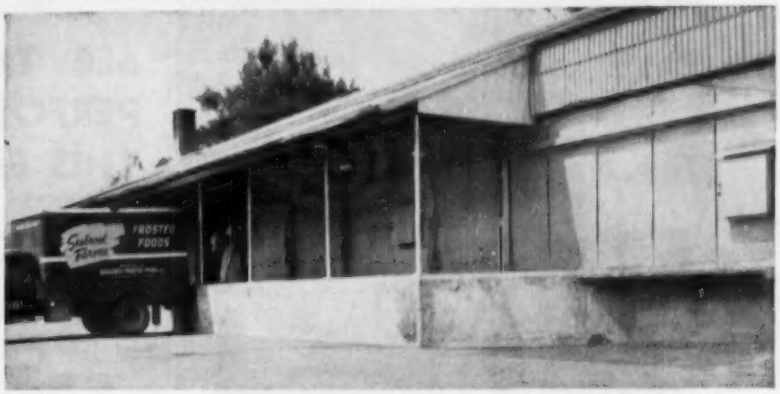
A. No. We were renting space then and it was awful. One place was tiny and had a sweating cork lining. Before that we were in a soggy, vermin-infested subbasement with temperatures up to 18°. Finally we decided to build our own cold storage plant.

Q. Having no experience with a frozen storage setup of your own, how did you go about your plans?

A. I visited other people's plants. One operator was particularly enthusiastic about how simple and inexpensive his unit was to build and operate. The cold box's metal-clad sides were the outside walls of the plant, it was completely leakproof and as clean as your own kitchen. It was the first Armorply installation I'd seen. We purchased our room from the Freezer Box Division of Annapolis Yacht Yard, Annapolis, Md.

Q. How large was the Armorply cold room you decided on?

A. 60 by 60 by 10 feet, and frankly, we didn't think we'd ever fill that 36,000 cubic feet. Now we've had to expand it with a 40-foot extension. I'm sure we couldn't have been as successful under the conditions we put up with when we rented freezer space.



Simple construction keeps initial outlay to a minimum. Strong Armorply walls become the plant's walls, need no protection from the elements. Metal surface reflects heat away, helps temperature control. Room supplied by Freezer Box Div., Annapolis Yacht Yard.

Q. How has your Armorply frozen storage room helped you cut operating costs?

A. For one thing, Armorply's metal surface reflects heat away, helps us keep power costs down. And the expense caused by vermin, dampness and spoilage has been completely eliminated.

Q. Did this expansion you mentioned cause much trouble or expense?

A. Not at all. We hired three unskilled workmen, gave them ratchets and had our general foreman boss the operation.

Q. What about maintenance or replacement of Armorply panels?

A. We haven't spent a cent on maintenance *or* replacement of Armorply since we put the unit up in 1951.

* * *

Armorply is waterproof plywood with a metal face permanently bonded on either or both sides. Possible metal faces include steel, stainless steel, monel, aluminum, lead, copper, and others. It's lightweight, verminproof and impervious to moisture, remarkably strong and very easy to fabricate. Send the coupon below for more information.

Expanding is easy because Armorply panels are bolted together in seconds. When cut-outs for bolts are re-covered, you have a smooth, easy-to-clean surface. This is interior of Berkshire Frosted Food's new extension in Pittsfield, Mass.

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FREE: Please send me free sample of Armorply and descriptive literature. ☐
Please have a salesman call with full details. ☐

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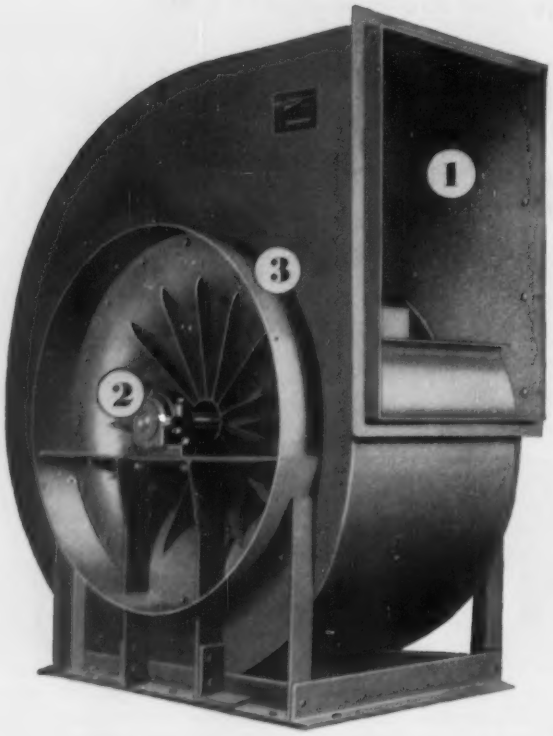


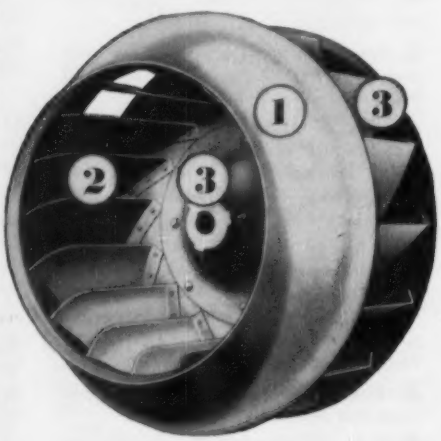
Double Check EVERY FEATURE!

✓ ✓

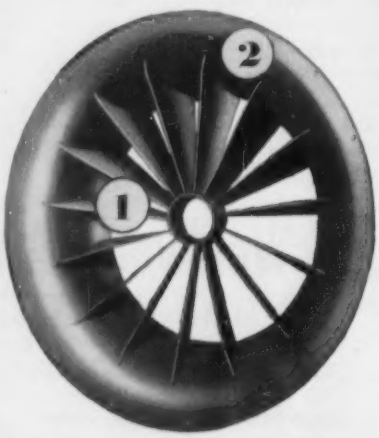
SEE THE MANY EXTRA PERFORMANCE FEATURES THIS FAN ALONE OFFERS

"Buffalo" Type "BL" Limit-Load VENTILATING FAN This photo shows three of the unique features in the "BL" Fan which are giving users more for their money: (1) properly proportioned housing, streamlined for peak efficiency; (2) "Buffalo" self-aligning bearings (choice of sleeve or anti-friction type) for easiest maintenance and longest life; and (3) large, smooth inlet collar for easy duct connection.

ROTOR FEATURES *(at right)* Note the unusual rotor design which has made for exceptional stability and efficiency of performance. (1) Shroud is die-formed to full curvature to match inlet bell for proper air flow in wheel. (2) Backward-curved blades are die-stamped, welded and riveted for maximum strength — and insure stable air flow. (3) The heavy-gauge lack plate and extra-heavy hub provide strength where it's needed.



FREE-FLOW INLET Note "Buffalo" inlet guide vanes (1) which assure full rated delivery with minimum turbulence even when inlet conditions are unfavorable. Inlet losses are further reduced by the smooth, die-formed inlet bell (2) which matches the wheel shroud.



These and other features contribute to the famous "Buffalo" "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life— the best value you can recommend in a fan. For full details write for Bulletin F102.

"Buffalo"

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What's New in Food Radiation Discussed at Symposium

Process Automation—Pasteurization—Sterilization —Insect Control—Inhibition of Sprouting—Food Analysis

Practical and potential applications of radioactivity in the food industry were revealed by a series of researchers at a recent symposium in Boston, held under the sponsorship of Tracerlab, Inc.

Opportunities for process automation and in-stream analytical quality control by nuclear radiation devices were outlined by W. V. Keary, Chemical Engineering Department, Arthur D. Little, Inc., Cambridge, Mass.—

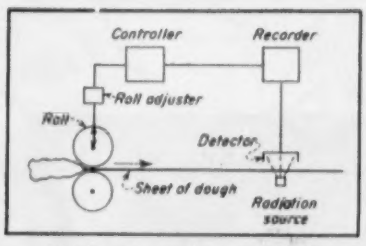
Radiation techniques offer new sensing elements in the form of devices which measure the transmission and scattering of controlled low-level radiation. The food material in process affects this radiation so that the level of radiation "seen" by a detecting device is a function of the property being measured.

Containers, even metal, are not opaque to such radiation, and possible contamination from mechanisms which must contact process materials is avoided. Since the sensing devices can be quite small, they can be located directly at the point where control is needed, thus eliminating process lags.

These devices add no radioactivity to the material in process, and do not affect it in any detectable manner.

There are several properties which have an effect on low-level radiation and therefore can be monitored. Among these are weight (mass), thickness, density, composition, and level. There are already several possible uses of these devices in the food manufacturing industry.

Typical application is controlling the thickness of a sheet of dough. A radiation source is placed under the sheet and a radiation detector over it. Any variation in thickness affects the amount of radiation passing through the dough to the detector. The detector, then, will actuate a thickness recorder and a servo-mechanism which will automatically adjust the clearance between the rolls.



Thickness can be controlled.

A time-delay mechanism is included in the control circuit to compensate for the distance of the detector from the rolls.

A back-scatter version of this control does away with the time-delay factor. Here, both the radiation source and detector are above the sheet and close to the rolls. The radiation passes through the dough, strikes the bottom roll, bounces back through the sheet to the detector, and measures thickness at the rolls.

Dollars and cents value of this application stems from production of finished product pieces of uniform thickness to permit close weight control in the package and avoid overfill. This might be applied not only to cookies and crackers, but to such foods as noodles, chewing gum, and sliced cheese.

Another practical application of nuclear process automation is seen in detecting whether each ingredient has been put into the container in multiple-fill operations, as in canning some soups.

Density also can be monitored radioactively to measure the mass per unit area. This might be applied to ice cream. Here, the speed of the mixer blades in the freezer would be automatically regulated to assure the desired overrun. In this case, the radiation source and detector would be mounted on opposite sides of the freezer discharge pipe. Mayonnaise density could be similarly controlled.

Possibility of regulating the specific gravity of syrups by radiation measurement has aroused much interest. So also has the opportunity to control the density of tomato paste in the evaporation process to an accuracy of 0.1%, thereby avoiding profit loss through give-away of solids content.

Another useful instrument, the mass flow meter, is possible with radioactive methods. It would measure density and velocity to give a direct reading in weight.

Level control of food materials in enclosed tanks and processing units can be achieved with a nuclear detector located entirely outside a tank or evaporator, thereby avoiding the sanitation problem sometimes involved with inside floats or directly connected instruments.

It has been hoped that radiation gages could be applied to the control of product composition, on the basis of atomic numbers and electron densities of materials. But this is complicated with foods because of the presence of oxygen.

Where Light Radiation Dosage Is Useful

Promising uses of gamma radiation for radio-pasteurization were cited by Lloyd E. Brownell, director, Fission Products Laboratory, University of Michigan, Ann Arbor—

The lowest dose of gamma radiation studied that appears promising is 10,000 rep. (roentgen-equivalent-physical) used for tubers, such as potatoes and onions, to prevent sprouting.

Over 2,100 taste tests indicated no preference for the control samples over irradiated potatoes.

Three facilities have been designed for commercial irradiation of potatoes, using cesium-137, mixed fission products, and spent reactor fuel elements. Estimated costs of irradiation averaged about $4.00 per ton, and were lowest for the reactor fuel elements.

A dose of 25,000 rep. was shown to be sufficient to break the cycle of trichinosis caused by human con-

sumption of fresh pork infested with *Trichinella spiralis*. A radiation facility was designed to treat 2,000 hogs per day, at an estimated cost of $0.29 per hog, using a 1.5 megacurie cesium-137 source.

A dose of 25,000 rep. might also be used to treat grain, flour, and cereal products, for control of insect infestation. Bread and cake flours were irradiated, and bread, biscuits, and cakes were prepared. Taste panel tests indicated that doses under 50,000 rep. produced no undesirable change. A facility has been designed to irradiate flour in 100-lb. bags, using reactor fuel elements as the radiation source, at an estimated cost of 2c. per 100-lb.

A radiation dose of about 80,000 rep. appears promising as a means of radio-pasteurization to increase refrigerator storage life of fresh meat and seafoods. A new method of wholesaling these perishable foods is possible with cutting and prepackaging at the packing house. A radiation facility has been designed to radio-pasteurize about 14 tons per hour of prepackaged meats, using a cesium-137 source. The estimated cost of irradiation is less than 1c. per pound.

As a possible "new" process, it is proposed that cooked meats, and other perishable items in which the enzymes have been inactivated, be packaged in heat-sealed polyethylene bags and given a dose of about 1 megarep.

It is believed that safe storage for several months will be possible by such a procedure. And if the food is acid, storage probably could be at room temperature.

Foods Can be Kept Fresh Longer

Recent developments in the cold sterilization of foods by radiation were discussed by Bernard E. Proctor, head of the Department of Food Technology, Massachusetts Institute of Technology, Cambridge—

While the nutritive value of food and its vitamin content are not usually seriously impaired by irradiation, fats and oils generally tend to take on rancid or other off-flavors.

Irradiated milk browns rapidly if heated to 100 deg. C., and research indicates that this change involves milk proteins and lactose. A similarity is seen with the browning reaction of sugars with amino compounds on heating or long storage. Such browning indicates the degree of chemical changes within the components of the milk.

In studies with meat, fresh pork sausage vacuum-packed in Saran and irradiated with 1,000,000 rep. was found edible after 120 days, at 36-40 deg. F. And irradiated canned sausage patties had better organoleptic quality after 14 weeks at 36-40 deg. than the same canned product stored at zero without radiation.

When ground beef was hermetically packed, irradiated at 1,000,000 rep., and stored 12 weeks at 36-40 deg., it was necessary to add 0.3% sodium fumarate and a like amount of monosodium glutamate to obviate off-flavor.

After 22 months in an ordinary refrigerator, canned beef slices that had been irradiated at 1,000,000 rep. did not taste like real fresh beef. But they were edible and had normal color and aroma.

With eviscerated poultry, tests indicate that storage life might be doubled. And even more could be achieved if free-radical acceptors were used to prevent off-flavors at irradiation dosages sufficient to kill all microorganisms.

B. E. Proctor outlines findings.

In recent tests, whole egg and egg yolk were irradiated at 850,000 rep. (twice the lethal dose for Salmonella), then spray-dried or lyophilized. And sponge cakes made from the eggs varied little from controls in taste and texture.

Commercial application of ionizing radiation in the food industry will require much more time-consuming and expensive research and engineering. But it would be justified. And a facility for large-scale gamma irradiation of foods is needed.

Radio-Analysis Clears PVA

A report on the solubility of polyvinyl alcohol in edible fats and oils, as determined by radio-tracer studies, was presented by H. K. Inskip, Electrochemicals Department, E. I. du Pont de Nemours & Co., Inc., Niagara Falls, N. Y.—

Since polyvinyl alcohol is a good coating for greaseproof food wrappers, an investigation was undertaken to determine whether this polymer could be employed safely in such applications.

The material was labeled with carbon-14 and cast into films. These were placed in contact with selected fats and oils under conditions representative of those which might prevail during the storage of packaged foods.

It was found that substances containing relatively small amounts of water did not extract significant amounts of polymer from the films. Food studies carried out with rats also indicated that the bulk of any polyvinyl alcohol ingested accidentally would be eliminated from the body.

On the basis of the data obtained, the Food & Drug Administration has stated it has no adverse comment concerning the use of polyvinyl alcohol as a component of wrappers for fatty foodstuffs, such as butter, lard, shortening, oleomargarine, bacon, nuts, and doughnuts.

Results of radio-tracer studies of the safety of polyvinyl alcohol in milk-carton adhesives were presented by D. G. Lundgren, Department of Plant Sciences, Syracuse University, Syracuse, N. Y.—

In these studies, two adhesives were employed, one containing 4.3% and the other 9.6% polyvinyl alcohol labeled with carbon-14. The activity level of the polyvinyl alcohol was selected to give an analytical sensitivity of at least 0.01 ppm. Storage tests at room and refrigeration temperatures were carried out using water as the extractant.

The results obtained showed that in all cases the water in the cartons contained no more than 0.01 ppm. of polyvinyl alcohol, the present unofficial zero contamination standard.

The data were submitted to FDA, which concluded that no contamination of the milk would be expected from the polyvinyl alcohol in the adhesive.

Handy Research Tool

The value of radioisotope tracers as an analytical tool was explained by Charles Rosenblum, Process Research & Development Division, Merck & Co., Inc., Rahway, N. J.—

The extreme sensitivity of detection of radioisotopes—combined with the unequivocal distinction between endogeneous and added elements and/or compounds—enables one to perform difficult analyses on the micro level. It also enables determination of the stability of organic and inorganic

(*Continued on page 161*)

They all taste better if you make 'em with '999'

Morton '999' Salt insures uniform flavor and quality in processed foods for two reasons:

1. Morton '999' is *guaranteed* always to contain more than 99.9% pure sodium chloride. The remaining 0.1% (or less) is a neutral inert sodium salt—and never bitter calcium or magnesium compounds.

2. Morton '999' Salt is produced by vacuum pan evaporation to assure you a salt that is clean, free-flowing... evenly soluble. It has a more constant weight per volume ratio which insures more accurate salt measurement.

For more information about Morton '999' Salt—and about Morton service and technical help—write this week to:

MORTON SALT COMPANY

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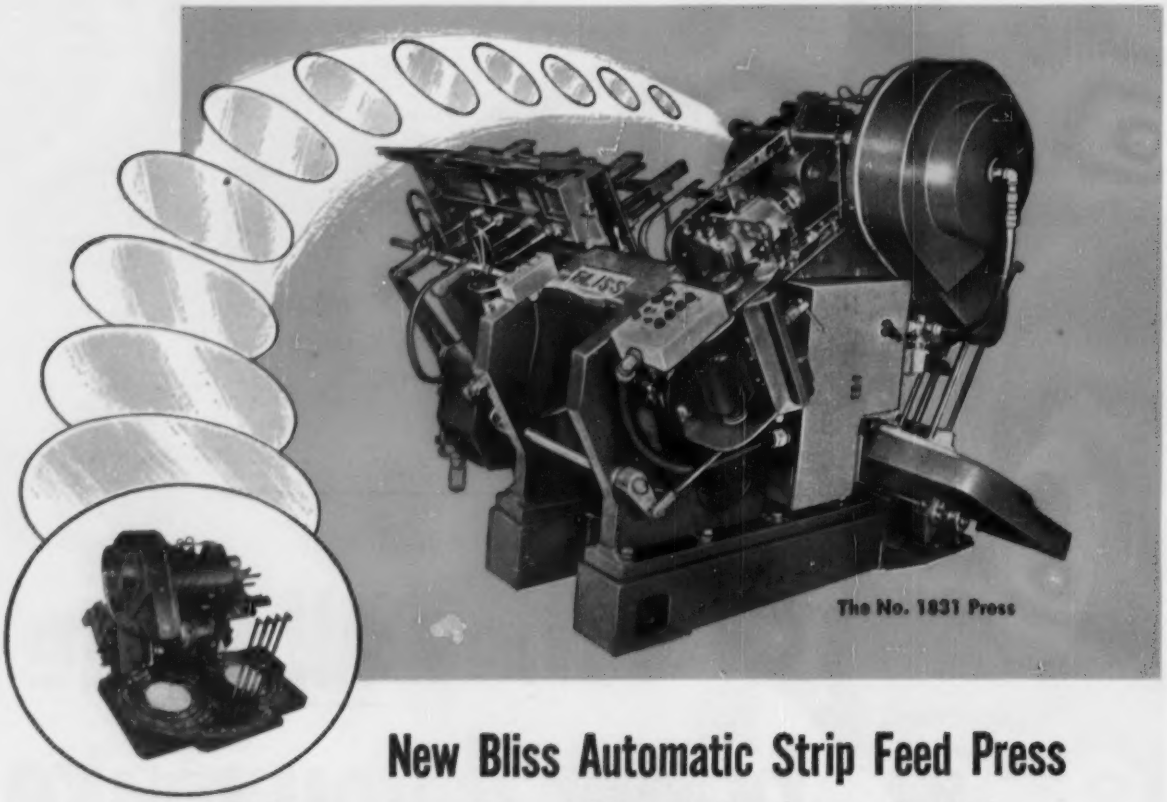

New Bliss Automatic Strip Feed Press will deliver more than 300 strokes per minute!

From the ground up, it's been engineered to slash maintenance needs and boost production speeds

You wanted speed in your strip feed presses—reliable speed! And here it is: to 300 strokes per minute (or more, depending upon can size), more than 18,000 strokes per hour all day long—without time-wasting stoppages for re-adjustment and repair.

One of the major features of the new Bliss press is its precision counter-balanced crank-shaft and feed bar crank which holds vibration to an almost irreducible minimum and thereby permits smooth, quiet operation at high speed.

Other features: combination disc friction clutch and brake—permits instant starting • feed bar is driven by crank instead of lever—and has adjustable fingers • a bigger bolster plate • no idle strokes between strips, if desired • slide stops instantly at top of stroke.

You'll want to know more about these developments. For complete details, write, wire or phone

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BLISS CAN AND CONTAINER MAKING MACHINERY

ON ARRIVAL at Odessa, waiting tractors "ramp" the trailers off cars and whisk them directly to customers.

Distribution Sped, Costs Chopped When

Trailers Travel by Train

THERE now comes further solid proof of the dividends paid by the "piggyback" system — transporting loaded trailers by railroad rather than by highway tractor.

In evidence, here, is Armour and Company's efficient 320-mile flatcar delivery route from Fort Worth to Odessa, Tex., in which the benefits have been twofold.

▶ Savings have been realized through the reduction in handling of the cargos and the smaller automotive equipment investment initially required.

▶ Better control of refrigeration temperatures is assured, particularly important in the hot Texas weather.

This packer had been delivering fresh meat to the Odessa area for many years. Formerly, large tractors pulled 32-ft. refrigerated trailers to deliver the load to Odessa. There it was unloaded into smaller delivery trucks. The empty tractor-trailer unit then returned to Fort Worth to start the cycle again.

With the piggyback operation, two 18-ft. refrigerated trailers are loaded on a railroad flatcar at Fort Worth. This car is whisked overnight to Odessa, where the trailers are then ramped off.

However, less than half of each trailer's cargo is transferred to the smaller trucks. The balance remains in the trailers, to be delivered directly by two small tractors based at Odessa. This latter cargo is thus maintained at more constant temperature, giving greater protection to the meat.

Under the old operation, three heavy-duty tractor-trailer units were required in addition to five smaller refrigerated trucks stationed at Odessa.

With the new system, three rail

(*Turn to page 169*)

SPRING-FITTED chains secure the trailers on cars for their journey.

The year's biggest truck news is right here on this page!

New INTERNATIONALS!

All-Truck Built to save you the BIG money!

It's here! A great new line of light, medium and heavy-duty INTERNATIONALS from 4,200 to 33,000 lbs. GVW. They're *all truck,* with no passenger car components asked to do a truck job . . . with more features than ever for BIG money savings, in operating and maintenance costs.

These new INTERNATIONALS are powered by a range of 10 gasoline and LPG engines designed specifically for trucks. They give you high power and torque in the normal driving range where you can *use* it — in traffic, heavy going, up hills. And they give you this top performance at wear-reducing, money-saving rpm.

They have smart, functional styling for easy, economical maintenance, even on the roughest truck jobs. They have driver-saving cabs that let drivers work longer without fatigue. First chance you get, see these good-looking, easy-working, BIG money-saving INTERNATIONAL Trucks.

Drive in real comfort! Comfort-angled steering. Hood is low for closeup view ahead. There's "Quiet-ride" acoustic roof lining, draft-free door seals in both standard and optional deluxe cabs, plus a wide choice of solid and two-tone exterior colors. New deluxe cab has additional color-keyed interior, deluxe steering wheel, foam rubber seat, fiber glass insulation, deluxe chrome trim.

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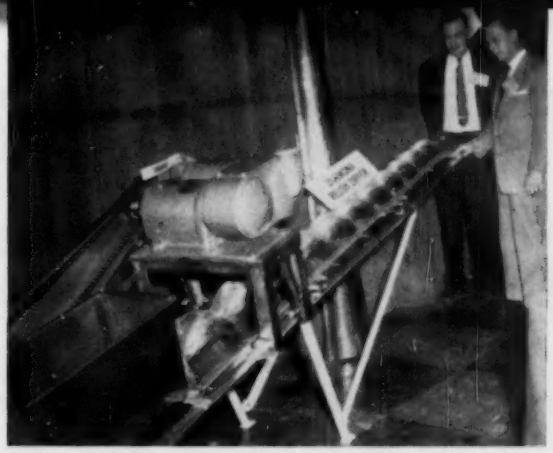
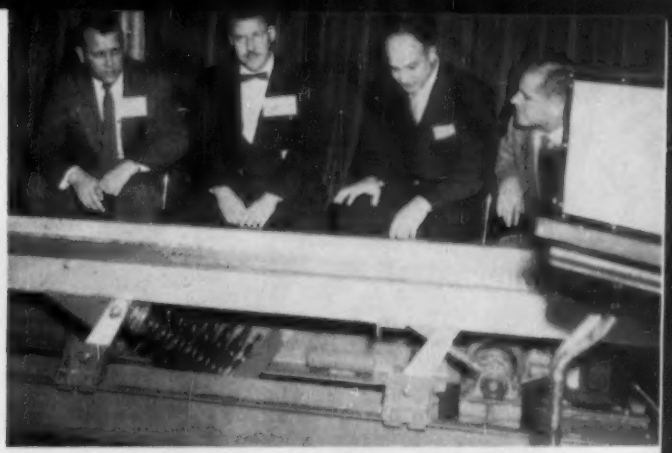
McCormick® Farm Equipment and Farmall® Tractors



UNIT DRIES up to 7,500-lb./hr. of relish. Comprises feed hopper and 10-ft. tapered cover-enclosed screw, with perforated bottom screen. Degree of relish dryness is controlled by varying speed of screw.—Chisholm-Ryder Co., Niagara Falls, N. Y. (109A)



CONTINUOUS separator's vibrating-screen deck removes ends, seeds from pickle slices. Cull pieces drop through to trough. Mesh size varied for any type slices. Conveying speed: 30-40 fpm. Unit ups capacity, saves labor.—Stephens-Adamson Mfg. Co., Aurora, Ill. (109B)

Advanced Processing Machines

New vegetable cutters and separators, liquid proportioner, relish dryer, and vinegar generator are caught by FE camera at National Pickle Packers' Chicago Exhibit

VERSATILE DEVICE cuts a variety of vegetables into different size slices, strips, or dice by simply exchanging cutters. Handles up to 4,400 lb. hourly. Manufacturer: Engineer-Design Co., N.Y.C. (109C)

WORK of score of hand cutters is done by unit that longitudinally quarters cukes, beets, brine stock, etc. Product goes through 4 equi-spaced, circular knives.—Chisholm-Ryder Co., Niagara Falls. (109D)

MICRO-PROPORTIONER dispenses 0.02-4.0 ml. of liquid per stroke. Fills up to 150 containers per min. Operation: Container trips switch to energize solenoid and extend bellows that draws into it measured amount of liquid through double valve. Container passes switch to de-energize solenoid. Bellows forces liquid through valve-discharge port and delivery tip into container.—Displayed by Kaufman Laboratories, Louisville, Ky. (109E)

THIS SEPARATOR (Sweco) handles wide variety of materials. It employs controlled gyratory motion (vertical and horizontal planes). Maker cites long screen life, high capacity, clean separation, S'west'n Eng. Co., Los Angeles. (109F)

EFFICIENT vinegar generator employs high-speed, submerged-fermentation technique, without use of packing materials. Permits smaller tank, saving space. Suitable for most raw materials.—Exhibited by Engineer-Design Co., N.Y.C. (109G)

SAFETY ENGINEERS heard top men tell about their accident prevention programs—and the questions were hot.

How They Put Safety Into Plants

Practical pointers from food-factory experiences are spotlighted at sessions of recent 43rd National Safety Congress in Chicago

FE STAFF

Accident prevention is basically a simple program of recognizing and controlling accident causes.

But the important thing in any plan is that you work it. And this was the pertinent point with which N. E. Thiel, Director of Safety for Southern Dairies, Inc., Charlotte, N. C., prefaced these comments on safety:

"We recognize that accidents are of two types: Those caused by faulty work environment and faulty human behavior.

"Faulty environment may be due to:

1. Improper guarding
2. Defective materials and equipment and tools
3. Hazardous arrangement
4. Improper illumination
5. Improper ventilation
6. Unsafe dress or apparel
7. Poor housekeeping

"Faulty Human Behavior is caused by:

1. Physical or Mental Characteristics
2. Lack of Knowledge or Skill
3. Wrong Attitude

"Every month we have an inspection of all our plants, equipment, and vehicles for unsafe conditions. Our plant safety committee reviews the inspections and makes recommendations for the correction of any unsafe condition noted. It is then up to the supervisor to get the unsafe condition corrected.

"We also recognize the problems of faulty human behavior.

"We try to control them at the start by a pre-employment physical examination. And acceptance or rejection of an applicant is based on a physical-requirement job analysis. If the applicant is accepted, he has an annual physical examination thereafter to be sure he continues to be able to do the job.

"Another accident cause in the category of faulty human behavior is lack of knowledge or skill. Every supervisor attends one supervisor's safety training session every year. Basic safety supervision responsibilities are discussed in detail.

"Every employee attends a safety meeting once a month. Usually this meeting is conducted by the department head, and it follows a safety conference outline we send to him. Occasionally it is a general safety meeting attended by the entire plant operations personnel.

"When we hire a person, the department head personally indoctrinates the employee regarding the job and its problems. The man or woman is then turned over to the foreman in charge of the type of work the employee will do. The foreman explains each step of the procedure, and stays with the new employee until he is fairly proficient.

"We determine our accident causes by:

1. Study of plant accident history
2. Thorough investigation of every accident
3. Plant inspections
4. Safety suggestions
5. Job analysis

"All of us are hammering away at the obvious and are getting results up to a point. But we have just scratched the surface in regard to the number of accidents we can prevent.

"Needed is a long-time process of safety education, beginning in grade school, and continuing through high school and trade schools. When a large percentage of the working population have this safety training, we

(Turn to page 157)

It's time ...to ask your suppliers for IONOL®, C.P. *impregnated packaging...*

newest, low-cost way to protect foods against oxidative spoilage

When fats and oils migrate from food product to box or wrapper, they rancidify quickly, causing deterioration of flavor and aroma.

The effective way to combat this serious threat to product shelf life is to incorporate Ionol, C.P.—a most efficient antioxidant—into the boxboard or wrapping material. Rancidity is then stopped right where it begins, at the *surface*.

In actual tests, baked goods stored at 85°F in Ionol, C.P. impregnated boxboard cartons, were free of rancidity at the end of ninety days. Without Ionol, C.P. protection, baked goods stored under similar conditions, often develop rancidity within a week.

When your food products contain fats or oils, Ionol, C.P. impregnated boxes or wrappers will greatly prolong shelf life. Additional protection can be assured by using Ionol, C.P. as a direct ingredient in your food products.

Ask your packaging materials supplier for this modern way to protect the good name of your brand label. Write to Shell Chemical for names of suppliers of Ionol, C.P. impregnated packaging.

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When our Population was only 50 million

stainless steel tower

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WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

In the early 1880's, when our population was three times less than what it is today, KOVEN was just beginning its career in the development of Individualized Food Equipment. The KOVEN goal was perfection, and far-sighted members of the food industry soon realized the excellent quality of KOVEN-built products.

Today, this same goal remains, and 75 years of experience have made KOVEN better able than ever to aid the food industry in a fast, efficient, and economical method of manufacture.

For Individualized Equipment tailored to your exact needs — call or write for a consultation with a trained KOVEN representative. There's no obligation. Send for Bulletin #550.

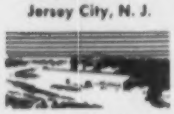
Specialists in intricate fabrication using:

stainless steel
monel
nickel
aluminum
inconel
all clad materials

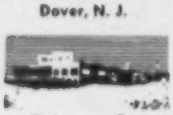
Fabrication to all A.S.M.E. Codes

Plants:

Jersey City, N. J.



Dover, N. J.



Trenton, N. J.

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Brittle continued to storm: "This time it's that lanky greenhorn Joe Spillut!"

Ole Sage Episode

SHOULD "BOOM BE LOWERED" ON INEPT SUBSTITUTES?

Foreman Mike Brittle figured the bungling Joe S. ought to "get it with a bang." But after Ole Sage showed how bangs can backfire, a much wiser answer was revealed . . .

IVAN C. MILLER
Associate Editor, "Food Engineering"

Mike Brittle, foreman at Zenith Canning Co., paced the floor in front of the superintendent's desk.

"Mistakes! Mistakes! Mistakes!" he railed, accenting his words with pounds on the desk. "I tell you it's nothing but carelessness on the part of these dumb-heads."

He boiled on: "Got to do something. Going to discipline some of them as an example. That'll make 'em stop and think."

"Sit down, Mike, and relax," invited Superintendent Ed Strong. "And then when you get your breath, tell me who's done what."

Brittle continued to storm: "It's mostly this substitute business, since our regular operator, Mason, has been away. These substitutes really gum the works. This time it's that lanky greenhorn Joe Spillut."

Strong turned to Ole Sage, who was seated at an adjoining desk. "Brittle's department has really 'had it,' said the superintendent. "Production has lagged and quality's suffered."

He paused to light his pipe, then went on: "It may be carelessness and indifference, as Mike claims. And then, again, something else may be the cause. Anyhow, Ole, do you think it wise, under the circumstances, to hand tough discipline to this substitute worker?"

Ole shifted his bulk in his swivel chair, then asked Brittle: "Has Spillut been specifically trained to replace Mason? Is he qualified to take full responsibility?"

"Maybe not, exactly," hesitated Brittle. "But he did fill in on Mason's job a part of a day last year. And he seemed to get along all right then."

Straightening up in his chair, Ole opened a file drawer in the desk, searched through some folders, and finally pulled out several legal-length sheets.

"Here we are," he grinned, flourishing the sheets. "Just last year a situation like this one built up into a case that ended in arbitration." He laid the papers on the desk and read:

Jeems K., classified at the time as a helper in a plant processing tomato products and soups, was required to relieve an operator in one of the kitchens. During the previous year and a half, he had performed similar relief service several times.

On the day in question, however, Jeems made the error of adding a specific ingredient twice in one cooking kettle, and then he failed to add any at all to another batch.

These errors were not detected until the products had been started through the filling machine. Hence, production had to be halted, and considerable time was lost removing filled containers from the line. Only with difficulty and at added cost were the remainders of the batches reprocessed.

The company then put a 'disciplinary notice' in Jeems' personal file and warned him that the next error would result in 'time off'.

Jeems thereupon filed a grievance, which eventually went to arbitration. The union then argued that when Jeems committed the error he was classified as a 'helper,' not a cook or kitchen operator. Since the kitchen job was a better one, for which Jeems was not being paid at the regular rate, Jeems should not be held responsible for errors. Furthermore, the union claimed that errors had been made by other employees in the past, but that these had not been treated in that formal manner by the company.

The company answered that Jeems violated explicit orders from his foreman regarding mixing operations. Such carelessness, the company contended, should be punished, especially since Jeems had done enough relief work of that kind in the past to know better.

The company denied that Jeems was dealt with more

UP THE HARD WAY came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1955 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head" —thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*

harshly than other workers. Examples cited by the union of the other mistakes, the company pointed out, concerned employees who had less experience than Jeems. Furthermore, their errors were caught before the damage became serious.

Finally, to demonstrate that the company was not discriminating against Jeems, the personnel manager testified that after the grievance was filed, Jeems was reclassified to 'Helper and Kitchen Operator, Grade 3.'

Ole looked up, and Brittle interjected, "The company was dead right!"

"We'll see," said Ole without agreeing. "Here's the arbitrator's views," and he read on:

In this case, the Arbitrator believes that the weight of evidence indicates Jeems K. was unjustly disciplined.

This conclusion is based upon several considerations which, taken together, point to an award in favor of the grievant. They are as follows:

(1) It appears that Jeems K., when assigned to the kitchen operations, was in fact assigned to work not included in the helper job classification, properly speaking. The union contends that this was the situation that actually existed. The circumstance that is most persuasive to the Arbitrator is the fact that after the grievance was filed the company and union agreed upon another job classification for Jeems K.

This new classification—Helper and Kitchen Operator, Grade 3—obviously charged Jeems K. with kitchen responsibilities. The fact that this change was made appears to the Arbitrator to establish the union contention that previously he had been performing kitchen duties in a capacity that was over and above his formal helper responsibility.

It is to be noted that this finding is not related to the rates of pay earned by Jeems K. before and after his new assignment. Rather, the finding rests on the implications with respect to work responsibilities.

Since Jeems K., when serving as kitchen operator on Feb. 10, 1954, and at times earlier, was performing work outside of his classification responsibilities, the company did not at that time have just cause for issuing a written disciplinary notice for his kitchen error.

(2) It likewise appears to the Arbitrator that some element of unintentional discrimination may have been exercised here. The two other employees who made mixing errors had no such disciplinary action entered in their records.

It is understandable that the employee who had discovered his own error in time to prevent loss should have escaped disciplinary action. However, the error of the other employee was only discovered by the foreman.

The last fact would not appear to have absolved the second employee from censor. Exactly the same thing might have happened in this present case. This would appear to be true, though the aforementioned employee had somewhat less mixing experience than Jeems K.

Incidentally, no evidence was submitted to document the contention that the two other employees had less experience than Jeems, or how much less experience they had.

(3) The union appears to be correct in its contention that although the company stated that Jeems K. had been previously warned orally for errors, no such allegation was made by the foreman in his written disciplinary notice.

Brittle now had finally cooled off. "Guess I should soft-pedal it on Spillut," he admitted. "But," he asked Ole, "how can I keep all the rest from making mistakes?"

"Mistakes will always be," comforted Ole. "Neither you nor anyone else can eliminate all errors. But it's mighty necessary to minimize them. In fact, it's management's task to find out how best to cut boners down to that coveted minimum."

Ed Strong nodded agreement, and Ole went on:

"It seems to me that the way to work against these errors is obvious here. Training is the answer. The need for it is evident—for every employee on every job. Also important, I'd say, is job rotation to familiarize more employees with more work assignments."

Strong chimed in, "Things are moving fast on the management-labor front, and the many changes make things different today from what they were yesterday."

"How right you are," agreed Ole. "And as an example, any material extension along the lines of Guaranteed Annual Wages, supplements to Unemployment Compensation, and similar plans, will bring pressure making it especially necessary that each employee knows how to fulfill the duties and responsibilities of several jobs. And rotation is at least one means to that end."

Editor's Note—The settlement quoted in this fictional episode is taken from an actual parallel case weighed under rules of the American Arbitration Assn. Particularly, readers should not infer that other arbitrators would reach the same decision in apparently similar cases, since circumstances differ widely. Rather than being based on precedent, each decision derives from case histories, points of contracts, and specific evidence.

From Ole's Notebook

Tips for U. C. Claim Cases

When you must battle out questionable claims made for unemployment compensation, it is essential to be "up" on tactics.

The following seven practical suggestions are accented in replies made by a number of companies covered in a survey by the Bureau of National Affairs, Inc., Washington, D. C.:

1. Have on hand all the facts relating to the claimant's employment with the company.

2. Know the applicability of the unemployment compensation law.

3. Be represented at the hearing by competent department heads.

4. Attend all hearings.

5. Have a consistent company policy.

6. Be prepared to appeal if necessary.

7. Establish a close working relationship with the U.C. referee and local U.C. office members.

Boss Sees Own Reflection

Your human relations aren't just happenings out in the shop for management merely to examine objectively.

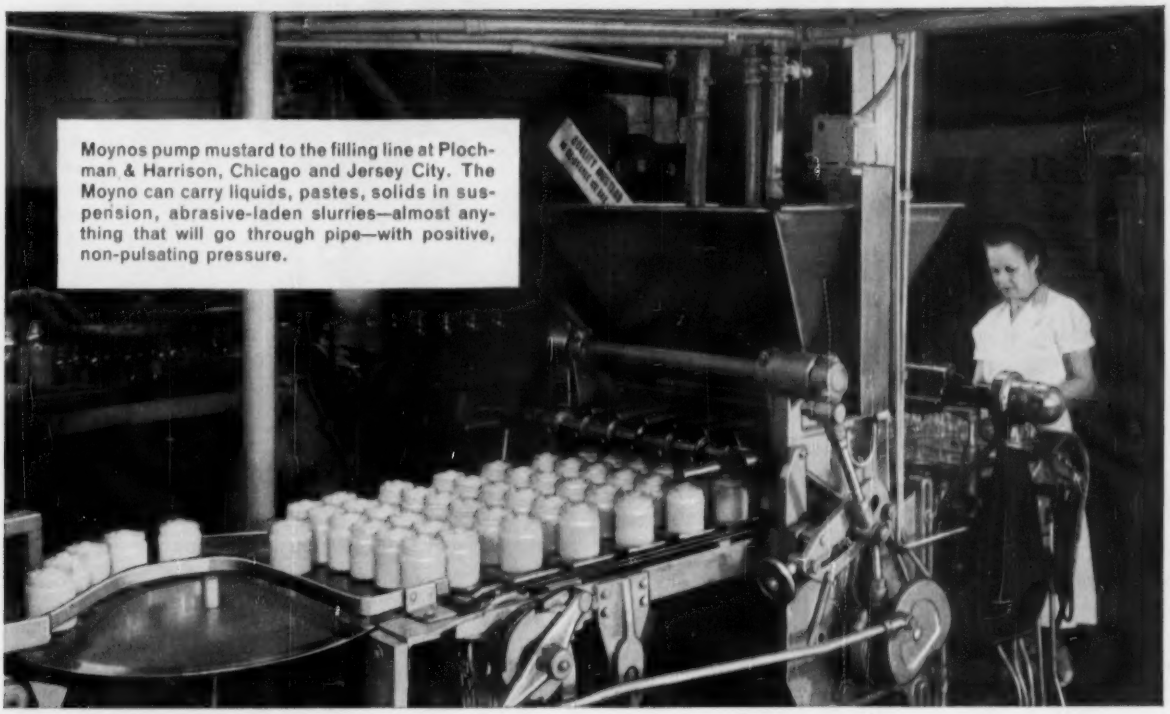
The most important relationship is that between the chief executive and second-line management—fixing a pattern influencing relationships all down the line.

When we study human relations we study ourselves. The boss concerned about the questionable behavior of his foreman may be seeing nothing more than the reflection of his own behavior.—*Human Relations in Small Industry, McGraw-Hill Book Co.*

Old Enough to Know How

Despite a general impression to the contrary, a relatively large portion of American men past age 65 are still actively at work, according to statisticians

(Turn page)



Moynos pump mustard to the filling line at Plochman & Harrison, Chicago and Jersey City. The Moyno can carry liquids, pastes, solids in suspension, abrasive-laden slurries—almost anything that will go through pipe—with positive, non-pulsating pressure.

Mustard Mill Changes to MOYNO® Pumps to Get Positive Displacement, Longer Pump Life

A Moyno Pump installation at Plochman & Harrison, makers of the famous Premium Brand Mustard, illustrates the outstanding performance of the Moyno Pump. They have been pumping mustard to a filling line with the Moyno for over two years without a single replacement of parts. They are replacing other pumps with Moynos.

The mustard is pumped as a semi-solid. In addition, it has both an acid and an abrasive content which causes other pumps to wear out in a few months. Moynos handle a wide variety of products that are not pumpable with other types of pumps. These include potato salad, chow mein, fruit, acid, alkalis, pastes, abrasive slurries, paints, tar, cement, plaster, many others.

The Moyno has a unique rotor and stator arrangement which forms sealed progressing cavities that move the material, providing positive displacement. For this mustard handling job parts were made of stainless steel to assure trouble-free service and long pump life. Rotor and stator are available in other alloys, or plastic compositions.

Note the outstanding features of the Moyno shown at the right. Perhaps your pumping problems can be solved with the Moyno. Write us today! Ask for a free copy of Bulletin 30-FE. It will give you complete facts!

Features of the MOYNO that may solve YOUR pumping problem

Gentle: no churning; won't break up semi-solids . . . won't aerate liquids. May be used for metering.

Reversible: pumps with equal efficiency in either direction.

Trouble Free: self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

Positive Displacement: Moynos are available to pull up to a 29" vacuum while discharging under pressure. Big Moynos deliver up to 500 g.p.m. Pressures to 600 p.s.i. plus are available.

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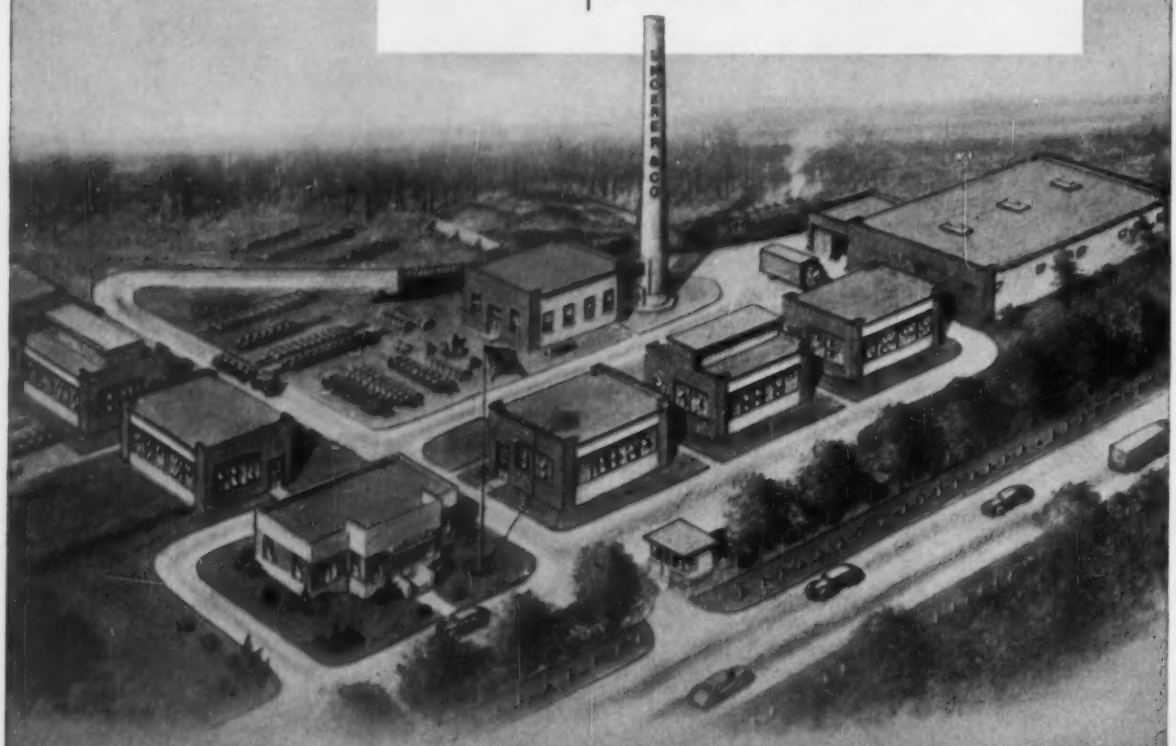

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of the Metropolitan Life Insurance Co.

Three-fifths of the men from 65 to 69 yr. are gainfully employed while at 70 to 74 the proportion has only dropped to two-fifths, according to estimates based on Census Bureau data. Even among men 75 yr. and over one in five is still working.

Of men who keep on working after 65, a much greater portion are self-employed than is the case among younger workers. Also a much larger proportion of men at this age work as farmers and farm managers, in executive positions in business, or as service workers, than are to be found among younger men. Only about one-fifth of those working at the advanced ages are in part-time employment.

Of course, it does not necessarily follow that a man who made a success in his own business during his working years would have made an equal success as an employee. However, when a retired employee makes good in his own enterprise after retirement, it seems apparent that his former employer might profitably have capitalized on his discarded abilities.

For Smoother Lay-Offs

When unexpected cancellation of a contract necessitated a lay-off at one company, the management came up with the novel idea of paying the men while they went around looking for other jobs.

Prior to the separation date, each man who was to be dismissed got two days off at full pay. He was allowed to take these in half-day periods, which gave him four "paid" opportunities to look for new work.

The results gained were remarkable. Of 121 workers who separated, only 7 left the company without having other jobs waiting for them. Two of these latter obtained work quickly and most of the other 5 had good prospects.

Apart from the money that the company may have saved by avoiding payments of unemployment compensation, there was the added factor that the program aroused a good deal of praise in the surrounding communities.

Morale and work quality in the plant remained high during the period of lay-off. And most of the dismissed employees would be pleased to work again for this organization—*Bruce McPhaden in "Supervision"*

$1.75 a Man For Reading

Management spends some $140 million a year on employee publications — newspapers, magazines, and other written material aimed mainly at the workers. And since 1947, this audience has grown by about 25 million—to a total of 80 million.

Tips on New Foremen

Skilled production workers are sometimes abruptly named as foremen and so must take on management responsibility without formal preparation.

These men may tend to retain the attitudes of labor, particularly when they, themselves, have been unionized.

However, if such new foremen are to be effective in the capacity of front-line management, then executive management must exercise every possible means to encourage and train them to use their management prerogatives.

These foremen must be given the recognition necessary to strengthen their confidence that the decisions they made to trade collective security for the opportunity to join management were right steps.

If they are not capable of accepting this recognition and don't measure up to the decision-making responsibilities —then they should not have been picked. Further, if it would embarrass a foreman to, say, lunch with one or a group of higher executives, or when these officials would be embarrassed by him under such circumstances, then management has erred in his appointment to its ranks.

On the other side of the coin, free enterprise is best advanced through unified management groups. Hence executive management must avoid treating foremen "like illegitimates."

Letters to the Editor

Suggests Food Film Be Made For High Schools

Dear Sir:

May I congratulate you on your splendid editorial in October Food Engineering on the need for supporting food technological education.

The specific suggestions enumerated for increasing the quantity and, presumably, the quality of food science majors are extremely worthwhile. And it is to be hoped that industrial support for them can be stimulated.

I would like, however, to add a suggestion of my own. It entails a relatively minor financial expenditure on the part of industry, and should stand a favorable chance of prompt adoption. I would propose that interested companies underwrite the cost of producing a short film, suitable for showing to high school audiences to awaken them to the opportunities in the food field.

If such a film were made available to the departments of food technology at different universities, it could be shown by them to high school groups in their areas. This would help staff members of these departments to address high school assemblies, answer their questions, and interest promising students in pursuing careers in food science.

In areas where food technology is not yet taught, interested professional or industrial groups might participate.

The logical organization for the production and distribution of this film, and perhaps other audiovisual material, is the IFT Committee on Education, of which Prof. Walter A. Maclinn, of Rutgers University, is chairman.—*Gideon E. Livingston, Assistant Professor, University of Massachusetts, Amherst.*

COMMENT—An excellent suggestion. And we hope that one or more companies or associations in the food industry, or allied fields, will give the idea serious consideration. Sponsors of such a film not only would help to solve serious problems facing them and their industry, but could build goodwill through appropriate acknowledgment in the introduction to the film. —The Editor

"Glucose-OxidaseCatalase" Correct Generic Term

Dear Sir:

We would like to congratulate you on the rather good treatment you gave a complex subject in your articles on egg solids.

There is, though, one additional bit of information we would like to add. On page 82 of the September issue, you refer to "deoxygenase-catalase." Although it may now be considered generic, the term "Deoxygenase" was —and may still be—a registered trademark for one particular brand of glucose oxidase-catalase mixture. (We have a brand called "Ovazyme.")

"Glucose oxidase-catalase" is the accepted scientific name for the enzymes involved in the reaction.—*Don Scott, Vice-President, Fermco Chemicals, Inc., Chicago.*

COMMENT—Quite right. This slipped by the eagle eyes of our staff. —The Editor

In Behalf of Progress . . .

Prosperity Challenges Food Manufacturers

"The Challenge of Prosperity" is the exciting theme-song of the food industry these days. It keynoted the recent annual meeting of Grocery Manufacturers of America. It was manifest in the "New Horizons" pitch at the American Bakers Assn. convention. It was dramatized by a look into the future at American Meat Institute's meeting.

Yes, this challenge to our industry is the talk of the times. It is real. And it offers an unparalleled opportunity to alert food manufacturers.

Involved in this opportunity is a technical challenge the like of which food engineers, technologists, and scientists never have seen. But that is another story.

What's behind this tossing of the gauntlet by prosperity? Outstanding are the continuing high income of consumers and their yen for more convenient foods—those with a built-in servant in every package—those with more value added by manufacture.

By the second quarter of 1956, the gross national product is expected by our economics department to pass the $400 billion mark. The old U. S. A. really is rolling. And on the basis of the maxim, "As goes capital investment, so goes prosperity," 1956 is going to be a good year for business and the economy generally.

American manufacturing industry is going to spend 30% more (yes, "thirty") for new plants and equipment in 1956 than it is spending this year. This is revealed in a new study of capital expenditures by McGraw-Hill. That survey also points to continued high spending in 1957.

It is the high-level of prosperity indicated by those and other economic indicators that constitutes the challenge to food manufacturers. Americans are spending 25% of their disposable income on food, compared to 23% in 1935-39. And they are buying nearly 50% more in terms of quantity, quality, and packaging convenience, according to GMA.

A record-breaking $68 billion is going for food in 1955. And this record should be broken next year by about three billion dollars.

Looking 10 years ahead, GMA's Paul Willis estimates that total food spending may reach $100 billion. And we estimate that, within two decades, expenditures for manufactured foods alone ought to reach $100 billion. Just how soon that figure is reached depends to a great extent upon how readily our field accepts the challenge.

Historically, the food sales trend has gone way beyond forecasts based on increased population and income. Sales jumped from $16 billion in 1939 to $64½ billion in 1954.

What with the dizzy increase of 11,000 a day in population, the rapid rise in income, and a quick acceptance of better and more nearly ready-to-eat foods, problems may even arise in meeting the demand for some foods in the next two decades. We feel safe, however, in the ability of engineering and science to take care of such situations.

How can food manufacturers capitalize on the opportunity afforded by the trends of the times? Obviously, more ought to be spent on research into new and better products, processes, and packages than the $80 million now estimated by GMA as going for laboratory work. And more than the current $20 million is needed annually for market research.

This research should show why, where, and how value added by manufacture can be increased in the finished packaged product to make it worth more to the housewife and to the institutional buyer

More convenience leading to economy in preparation is one example of added value that pays off. Longer shelf-life, together with cheaper handling and less waste in distribution channels, are other examples.

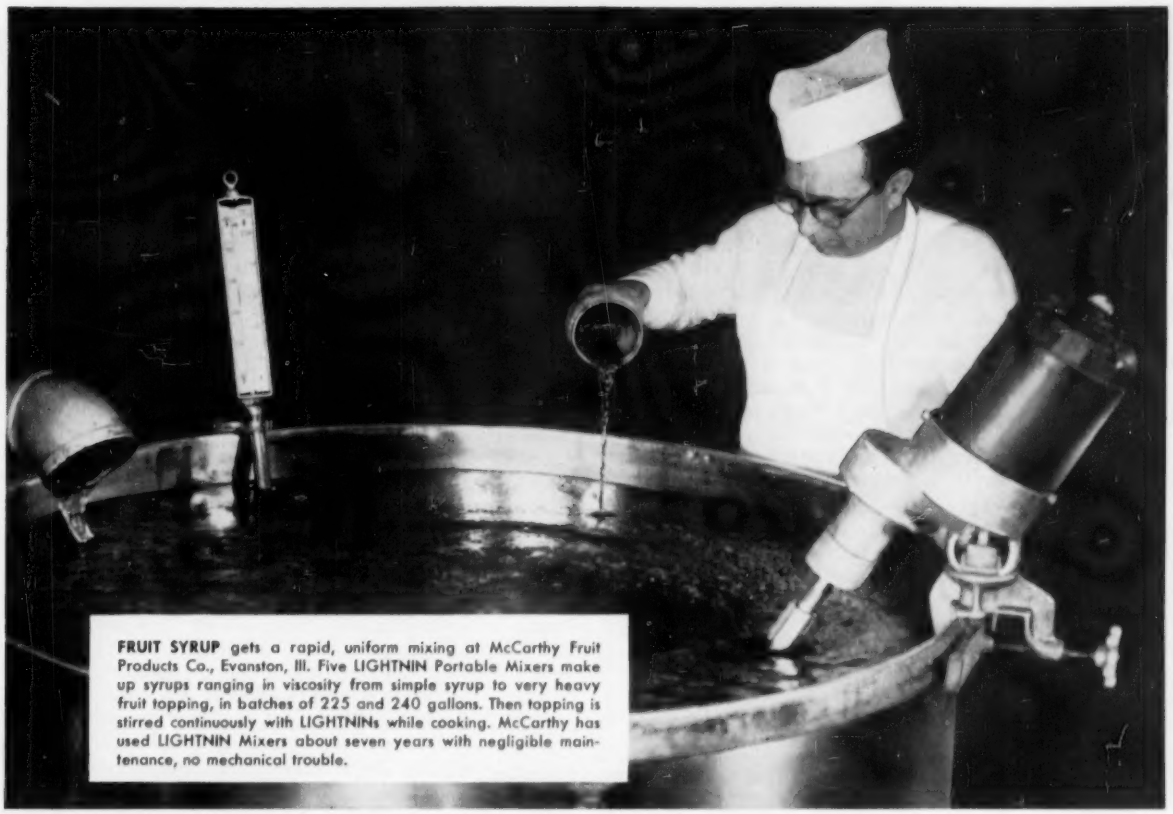
Of course, added value increases the spread between the price the farmer gets for raw materials and the price the housewife pays for the finished product. But so long as this spread represents an efficiently achieved product improvement, everybody benefits. Think how much value is added to cotton by the textile industry—and how this helps the farmer and the consumer.

To add value efficiently, however, calls for advanced processing methods—a higher investment in plant and equipment. There already is a strong trend in that direction. It need only to be accelerated.

Our industry's capital expenditure per production worker went from $7,500 pre-war to $17,000 in 1954. During 1955, over $700 million is being spent for new plant and equipment, the McGraw-Hill survey shows. Next year, the industry plans to lay out $743 million, and at least as much in 1957.

That is big money. And it points up the progress that food companies must match to meet competition. But the expenditure ought to be more nearly a billion dollars if the industry wants to take full advantage of the challenge of prosperity.

Opportunity knocks. Open wide the door.



FRUIT SYRUP gets a rapid, uniform mixing at McCarthy Fruit Products Co., Evanston, Ill. Five LIGHTNIN Portable Mixers make up syrups ranging in viscosity from simple syrup to very heavy fruit topping, in batches of 225 and 240 gallons. Then topping is stirred continuously with LIGHTNINs while cooking. McCarthy has used LIGHTNIN Mixers about seven years with negligible maintenance, no mechanical trouble.

How McCarthy Fruit Products mixes syrups without trouble

The McCarthy Fruit Products story is typical: "Efficient mixing . . . no difficulties."

And it's the same story we get from food processors everywhere who are using LIGHTNIN Mixers. Many of them have been using the *same* LIGHTNINs for 20 years or more.

You can get LIGHTNINs to handle *all* your fluid mixing—in any open or closed tank of any size or shape. Thirty portable models, in sizes from ⅛ to 3 HP. Other types from 1/42 to 500 HP. Mixing results are fully guaranteed.

For quick service, just call your LIGHTNIN Mixer representative. He's listed in your copy of Thomas' Register. Or write us today.

McCarthy gets these advantages with LIGHTNIN Mixers. You can, too.

1. Ball bearing motor. Continuous heavy-duty type. Bearings are prelubricated and permanently sealed.

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3. Easy shaft adjustment. Two-piece chuck grips shaft permanently—yet loosens instantly if you want to adjust, remove or change shaft.

4. Ball and socket clamp instantly locks the mixer at any angle for the desired mixing action. Quick, positive lock requires no wrench to tighten.

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Get these helpful facts on mixing: cost-cutting ideas on mixer selection; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Free—no obligation. Just check data you want, tear out and mail to us today with your name and company address.

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TURN PAGE FOR FOLDOUT FLOWSHEET →

Non-Stop Cracker Meal Line

—Turns Out Tailor-Made Mixes, Extenders, and Thickeners

ADVANCED ENGINEERING, through use of modern instrument-controlled equipment, particularly distinguishes cracker meal and breading mix production at Newly Weds Cracker Co., Inc., Chicago.

First step in the continuous processing is reception of the flour—Point 1 in flowsheet. Flour is "Airveyed" from rail cars or trailers to three 61,000-lb.-capacity metal storage bins—Point 2. When necessary, it can be dumped from 100-lb. bags into a hopper for speedy air-feeding to storage.

Bins are equipped with horizontal-type agitators and electronic probes that automatically sound a horn and stop flour-handling system as bins become filled. From triple-bottomed bins, flour is screw-conveyed to a 100-cu.-ft.-capacity metal surge hopper.

Here, a pair of screw conveyors, actuated by vari-speed drives, deliver flour at controlled rates to vibrating feeders. Latter are equipped with controls to regulate rate of flour-delivery into the two comminutors (Cog)—Point 3.

At this point, 200-F. water from a gas-fired boiler is introduced through an initial regulating valve (15 lb.). Then two regulators cut water pressure to 3 lb., assuring uniform spray blending. Resultant dough drops into two 8-in.-dia. horizontal screws. Here, dough-adherence is prevented by two reciprocating-type scraper bars.

For full details behind this advanced operation, see "Flour to Product in 17 Minutes," starting on p. 81.

Dough is forced through company-built extruders under a minimum pressure of 100 psi.—Point 4. This forms about 60 "ropes" that drop onto a 42-in.-wide wire-mesh conveyor and travel 120 ft. through a continuous oven (Werner). This three-zone unit is gas-fired (top and bottom) and equipped with forced draft ventilation. Temperature of oven can be varied (450-550 F.). Speed of travel is changed by a vari-drive.

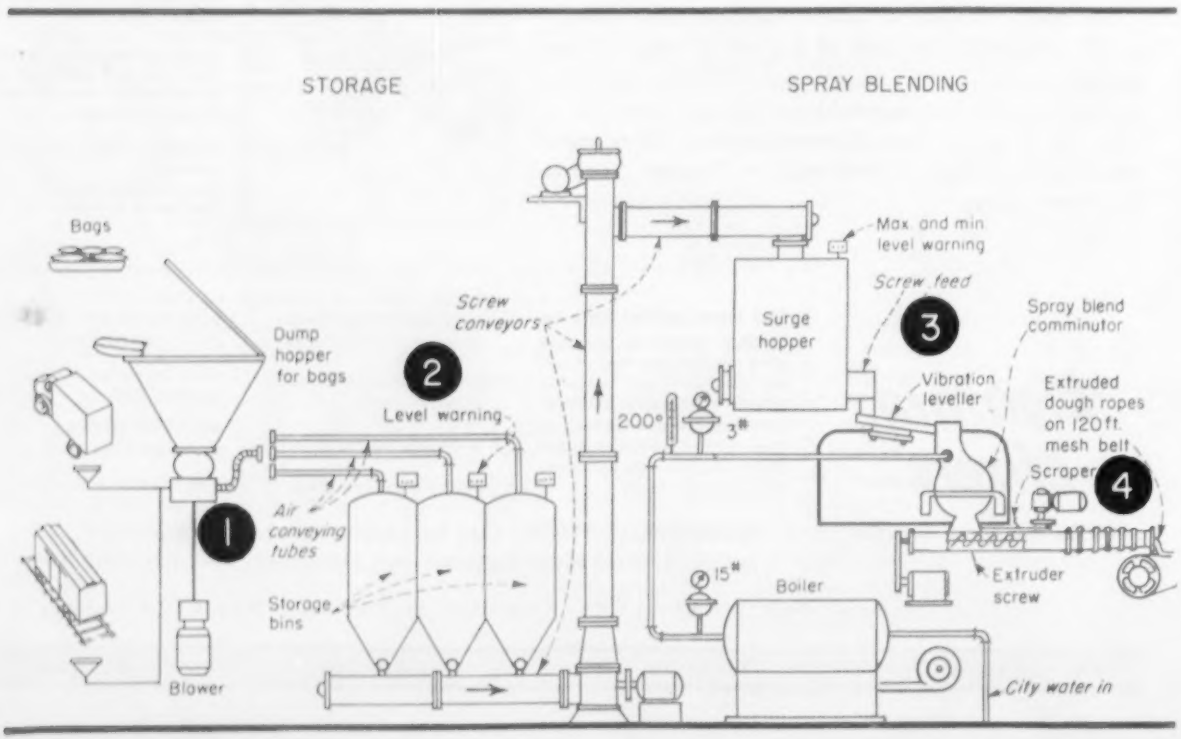
Coming out of oven, baked "ropes" are fed into company-built chopper—Point 5. Double-blade unit cuts ropes into ½-in. pieces. These are forced through a sizing screen and discharge into a horizontal screw conveyor. Vertical screw lift next elevates pieces to a 125-ft. horizontal screw conveyor having cut-and-folded flights that cool and agitate cracker pieces as they go to pulverizers. Exhaust hoods above chopper and horizontal screw conveyor draw cracker meal dust to a roof-installed cyclone.

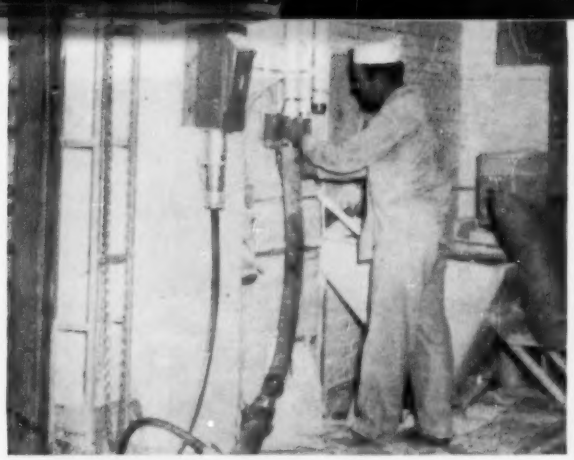
Meanwhile, cracker pieces travel to pre-grind mill—Point 6. Coarse meal is fed to roof cyclone, chuted back to horizontal screw conveyor, then discharged into a Cog comminutor for precision sizing—Point 7. Ground meal falls into a vibrating sifter. Tailings are conveyed back into the comminutor, and the screened product drops into a floor-level screw conveyor, equipped with cut-and-folded flights. If coarse meal is desired, cracker pieces can by-pass Prater mill for direct feeding into Cog unit.

For breading mixes, seasonings are metered into cracker meal from bins. Meal and mixes are delivered by vertical and horizontal screw conveyors into a 3,000-lb.-capacity metal holding bin, from which they are automatically packed into 100-lb. bags or drums, or 5-lb. bag lots—Point 8.

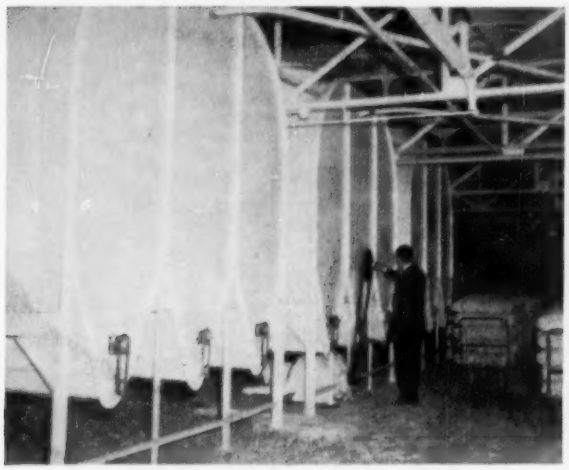
The editors thank F. E. Wilczewski, The Cog Corp., Chicago, for his cooperation in preparing the accompanying flowsheet drawing.

FOOD ENGINEERING December 1955 Pages 120-123

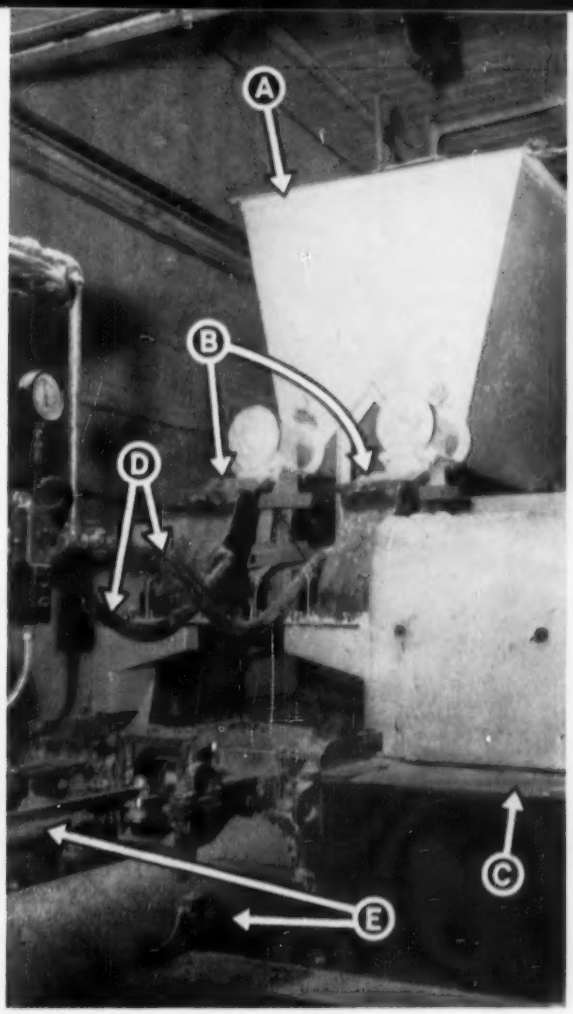




1 SIMPLE hose change blows flour from bulk-delivery rail cars and trailer trucks to any of three storage bins. Air system handles 50,000 lb. per hr.



2 BUILT-IN screw conveyors discharge flour from bins to common worm carrier—thus enabling blending of different flours. Each bin holds 61,000 lbs.



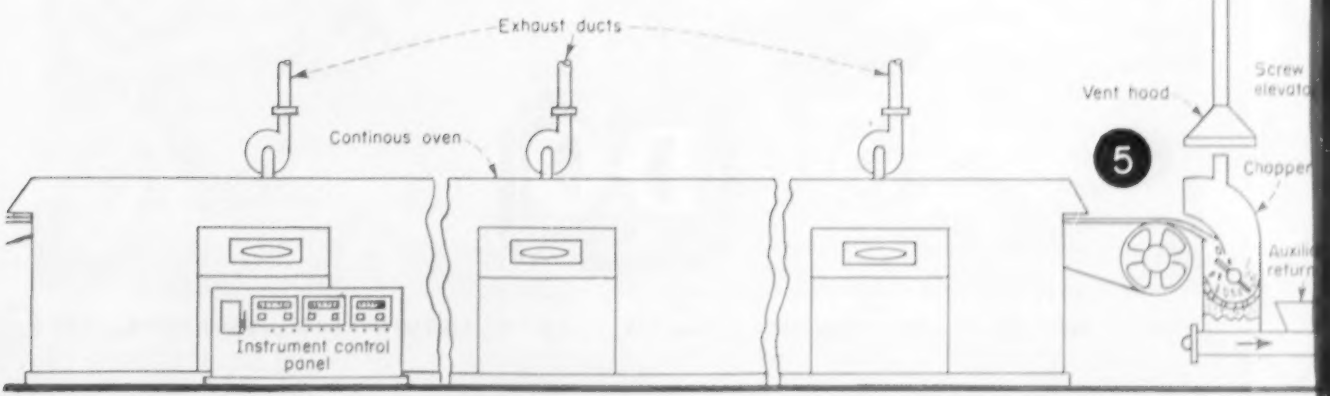
3 SPRAY-BLENDING stage employs impact-in-air comminutors to mix flour and water. Hopper (A) delivers flour to vibrating feeders (B) that discharge it into blenders (as at C). Hot water is injected through hoses (D). And resultant dough drops into extruding screws (E).

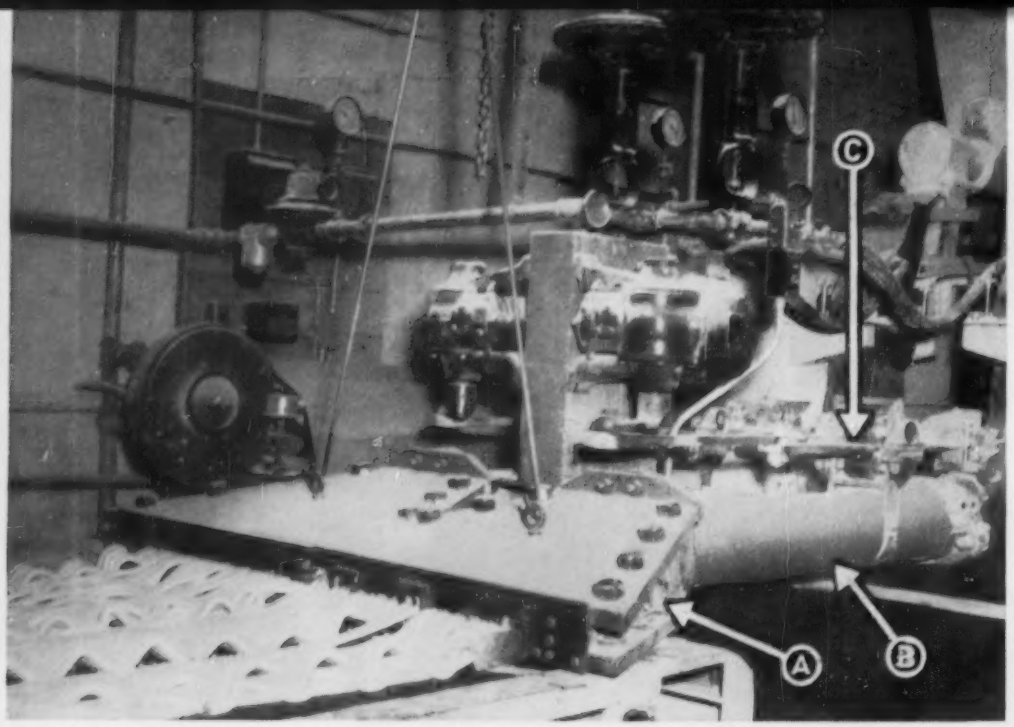
4 SPECIAL belt, then built scraper

BAKING

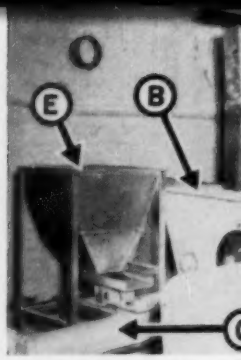
CONTINUOUS CRACKER MEAL LINE

FE PICTURE FLOWSHEET NO.83

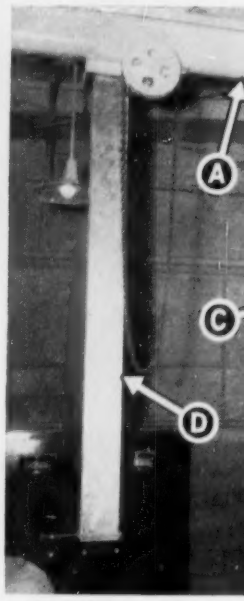




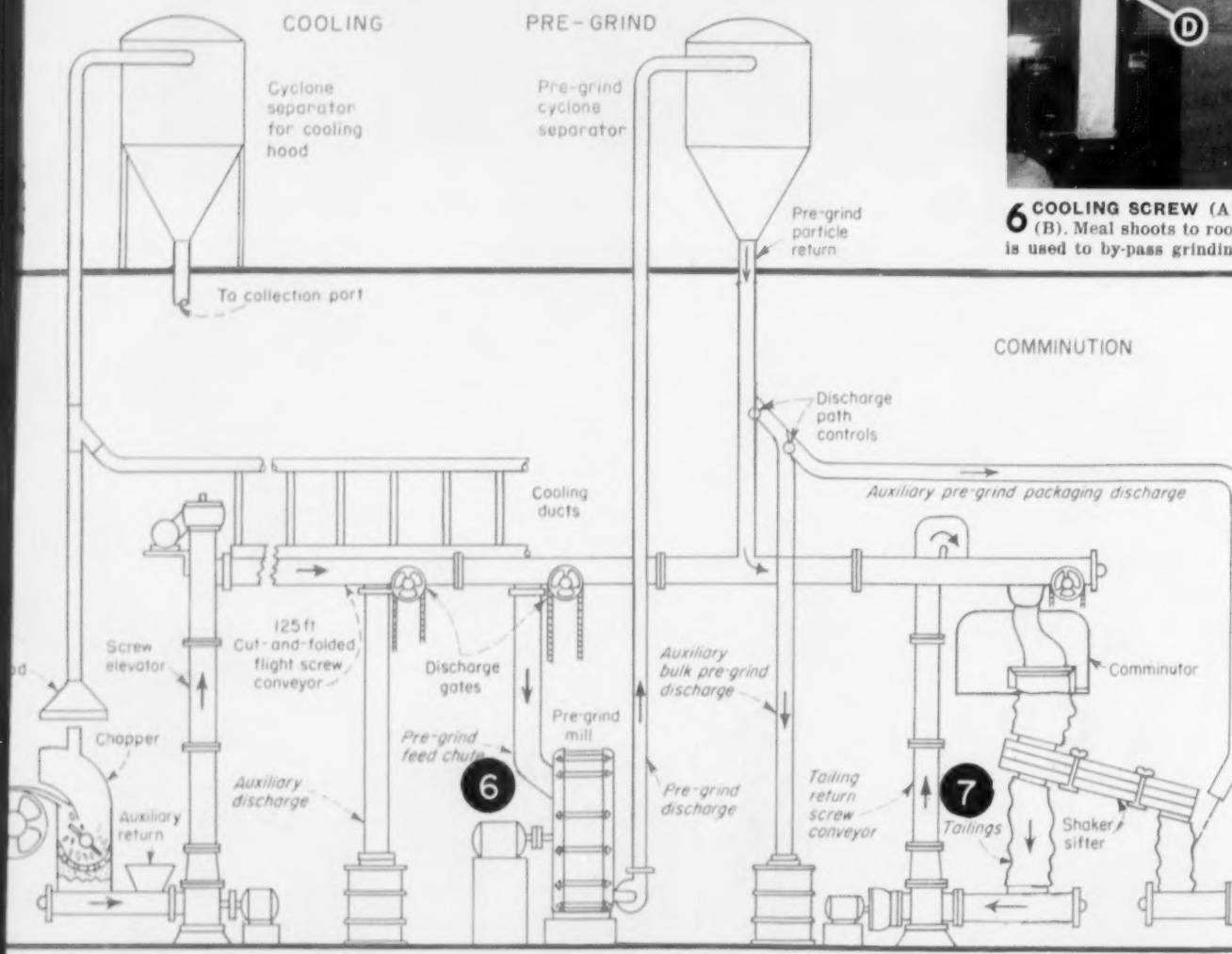
4 **SPECIALLY-DESIGNED** extruder (A) continuously forms dough into "ropes" that fall on a wire mesh belt, then pass through oven. Dough is prevented from sticking to extruder screws (B) by company-built scrapers (as at C) that are gear-motor powered through eccentric drives.



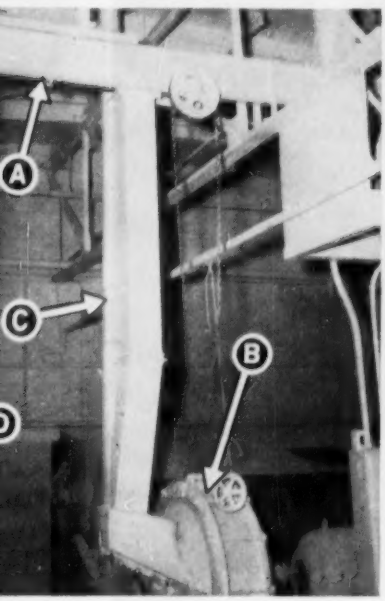
5 **BAKED DOUGH** (A) forces pieces through (D) exhausts dust. Extra



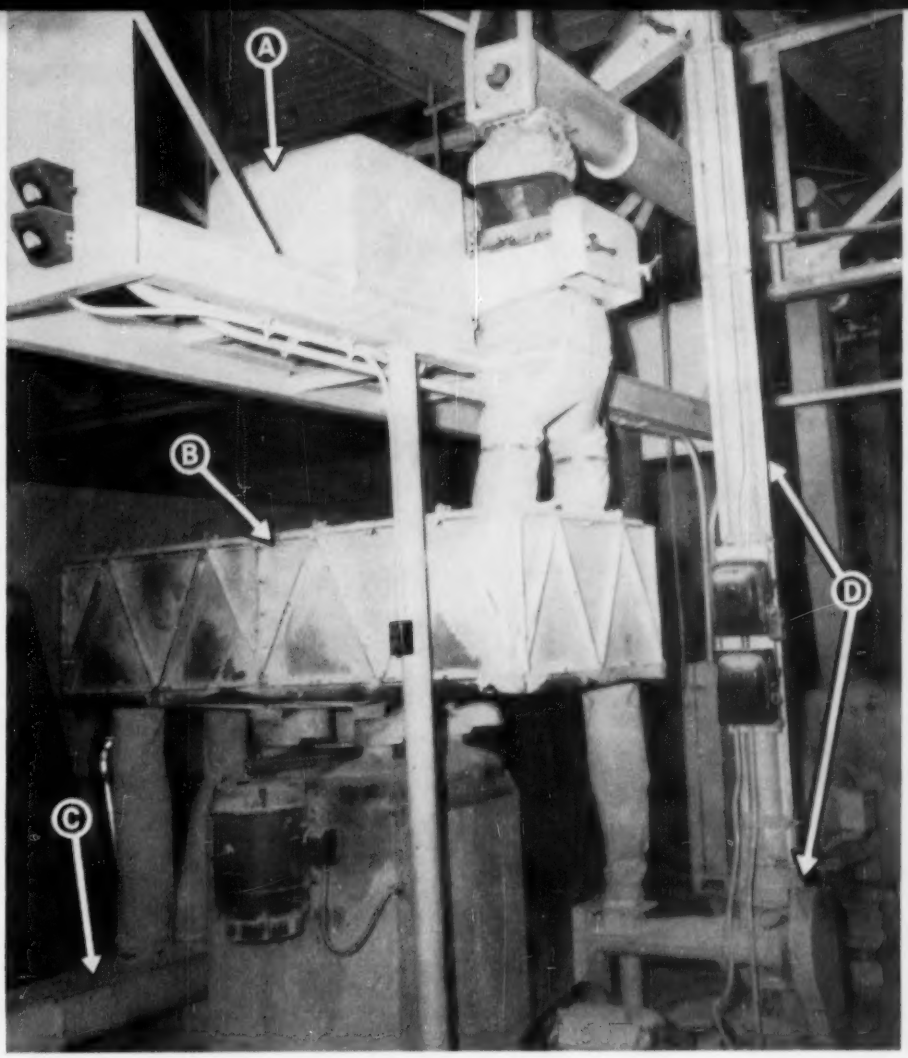
6 **COOLING SCREW** (A (B). Meal shoots to roo is used to by-pass grindin



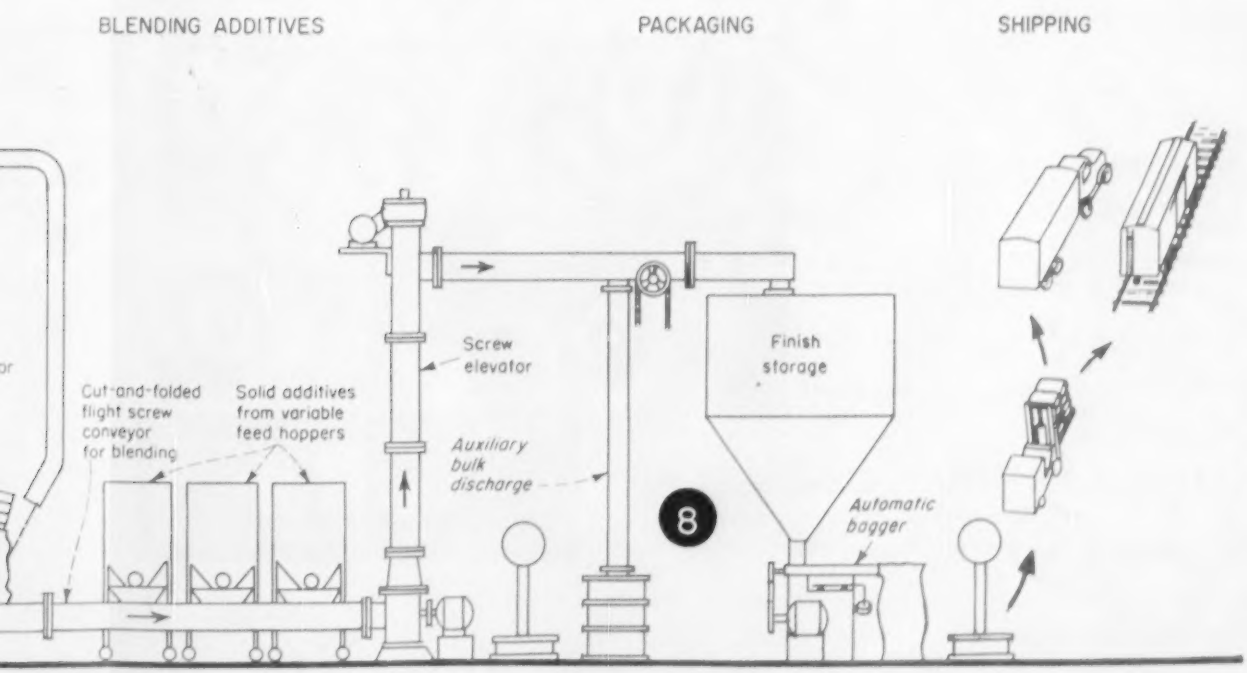
(A) passes to special cutter (B), which
ough sizing screen into screw (C). Duct
Extra feeder (E) adds flexibility.



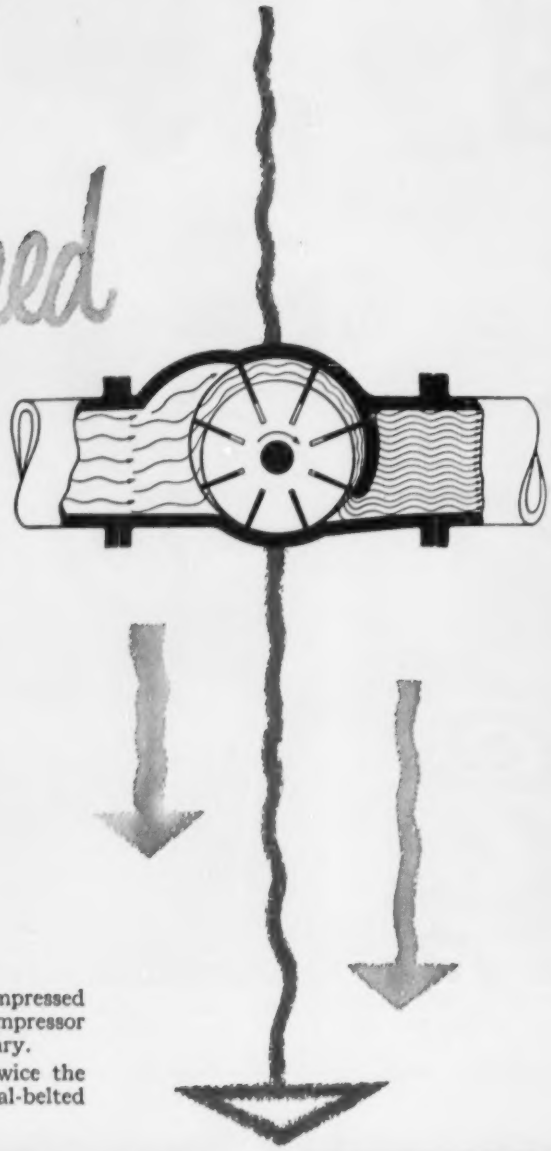
V (A) drops material into pre-grind mill
o roof cyclone through tube (C). Duct (D)
inding operations in case of trouble.



7 FINAL GRIND takes place in this mill (A). Dust-tight connections drop meal to sifter (B). Finished product discharges to screw (C), and tailings recirculate through screws (D) to grinder input.



When you need more AIR



When you require additional compressed air—and available space for a compressor is at a premium—try a Fuller Rotary.

Because it is a Rotary, it has twice the capacity of a comparative horizontal-belted reciprocating unit.

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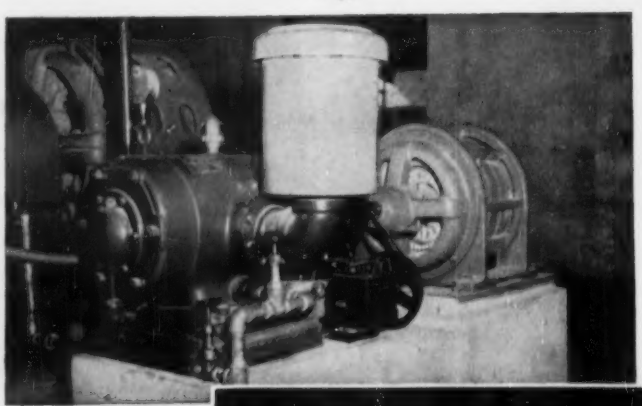
Because of these things, you can put a Fuller Rotary in almost any unused corner, or on a balcony, or even suspended from the rafters, if need be.

So, whenever you are cramped for space and air, you can ease your problem by specifying Fuller.

Pressures to 125 psig; capacities to 3300 cfm.

Detailed information on design characteristics and typical applications will be forwarded promptly on request.



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Operated an average of 35 times daily, each of the 24 quick-opening Crane brass gate valves on this installation keeps handling the flow of steam with highest efficiency.

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The Market Forge Co., Everett, Mass., finds these Crane No. 432 quick-opening valves well adapted to its famous cookers. It's a case of protecting a good product with quality equipment and giving buyers added value. The Conrad Hilton's experience is duplicated wherever these cookers are installed.

Whether you use quick-opening valves as machinery components or in plant service piping, you'll find Crane quality designs for all your needs. Crane makes them in gate and globe types, in brass and iron—for steam, water, oil, gas, air, gasoline, etc.—in a wide range of sizes. Your local Crane Representative can give valuable help in selecting these valves for your specific needs.

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The National Merit Scholarship Corporation

Business is Offered Big Dividends on Investment in Higher Education

The McGraw-Hill Publishing Company is availing itself of the opportunity to establish ten National Merit Scholarships. They will be known as the McGraw-Hill Merit Scholarships. The scholarships are to be awarded to qualified candidates for a four-year college course in the fields of science, engineering and the other professions and the liberal arts. There will be no limitation, beyond the appropriate professional accrediting, on the college or university selected by a successful candidate. As part of a continuing program to aid higher education and educational institutions, McGraw-Hill is happy to be able to share in what it believes to be the constructive educational endeavor of the National Merit Scholarship Corporation.

Business firms searching for a satisfactory avenue to provide financial aid for our colleges and universities now have a new opportunity of major importance. It is provided by the National Merit Scholarship Corporation, which has offered to devote $8 million to matching, dollar for dollar, gifts by business firms for college scholarships and supplemental gifts to the institutions where the scholarships are used.

The National Merit Scholarship Corporation, an independent agency financed initially by gifts of $20 million from the Ford Foundation and $500,000 from the Carnegie Corporation, has three major purposes which are closely related. They are:

1. To locate those of the nation's young men and young women who are best equipped to go to college.

2. When necessary, to help these young people go to college by giving them financial aid.

3. To help colleges and universities meet the full cost of the instruction of those to whom National Merit scholarships are granted.

At present about half of the nation's top high school graduates do not go to college. The principal reason is that they do not have the money required.

To Save Unused Brain Power

The National Merit Scholarship Corporation will strive to eliminate this dangerous neglect of top-flight ability. To this end it is inviting the nation's high schools, numbering more than 24,000, to participate in its program by designating as available candidates for National Merit scholarships the top 5 percent of their senior classes. Those so designated are then invited to take a series of tests and to submit reports designed to assure selection of the very best talent in each state. The number of scholarships to be allotted to each state will be proportionate to the number of high school graduates in the state.

The winners, the total number of whom will be determined by the amount of money the Scholarship Corporation has available, will be eligible for awards. For those who need no financial help to go to college there will be honorary awards of $100. For those who must have help the Corporation will grant scholarships covering as much as necessary

of the cost of instruction and living expenses for a four-year college course.

Colleges Get Financial Help

The provision of funds to cover the students' expenses does not, however, solve the financial problems faced by many colleges. That is because the tuition charges paid by the students do not cover the cost of the instruction. The deficit must be met by drawing upon endowment funds, gifts, grants, and other available sources.

Consequently, to prevent holders of National Merit scholarships from imposing any additional financial burden on the colleges and universities they elect to attend, the Corporation will make a supplementary grant to these institutions. The supplementary grant will be the equivalent of regular tuition charges made by the school, with a top limit of $1,500 a year for both the tuition and the supplement.

As the scholarship grants to the winning students will vary, depending upon how much financial help they need, so will the supplementary grants vary from one college to another, depending on their regular tuition charges. However, it is anticipated that on the average the full cost of a National Merit scholarship—including aid to the student and the supplement to the college—will be about $1,500 a year.

Many business firms will find a compelling appeal in a program which is designed at once to mobilize the nation's intellectual resources more effectively and, in the process, give very badly needed financial help to our colleges and universities.

Two For One Return Offered

However, there are numerous other inducements to business firms to finance National Merit scholarships. These scholarships may:

1. Carry the name of the firm or be named in honor of someone designated by the firm.
2. Be limited to use in types of colleges of particular interest to the sponsoring firm.
3. Be limited to a college course, such as science, engineering or liberal arts, of special concern to the sponsor.
4. Be restricted to candidates or institutions in geographic areas specified by the sponsor.

In addition to these advantages there is a special financial inducement to help the Merit Scholarship program. It is that for every Merit scholarship a firm or individual finances, the Corporation will, up to the limit of $8 million, match the funds and make another National Merit scholarship available.

There are many good ways of helping our financially beleaguered colleges and universities, and many corporations are already using one or more of them.* For those companies that can do so without embarrassing complications one of the best ways is to make unrestricted gifts directly to the institutions. But this new way provided by the creation of the National Merit Scholarship Corporation (Address: 1580 Sherman Avenue, Evanston, Illinois) has the broad appeal of serving two purposes of transcendent importance simultaneously. The purposes are to see that our best brains are fully trained and utilized and that our colleges and universities, crucial contributors to this process, are helped at the same time. Business will serve the nation and its own community well by giving the National Merit Scholarship Corporation generous help.

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* These, as well as the plight of our colleges and universities, are discussed in a pamphlet, "Business Aid to Our Colleges and Universities," which embodies a series of five editorials which appeared in all McGraw-Hill publications. Copies of the pamphlet can be obtained without charge by addressing the Department of Economics, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, New York.

Methods of helping our colleges and universities financially are also outlined and discussed in a pamphlet, "Aids to Corporate Support of Higher Education," which may be obtained without cost by addressing the Council for Financial Aid to Education, 6 East 45th Street, New York 17, New York.

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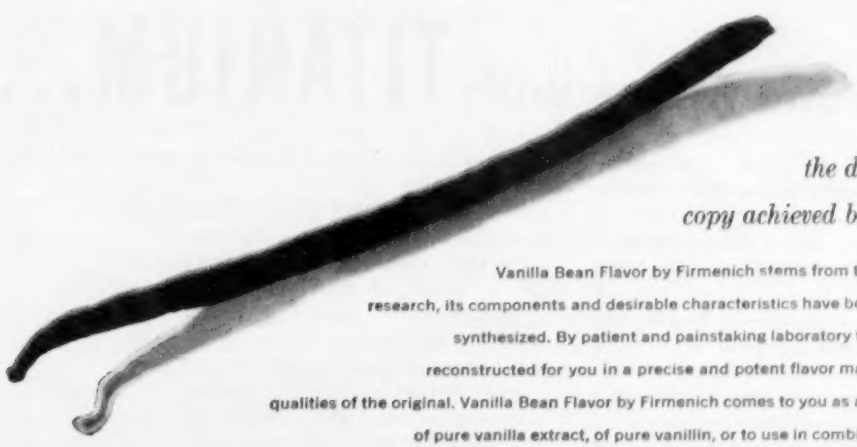

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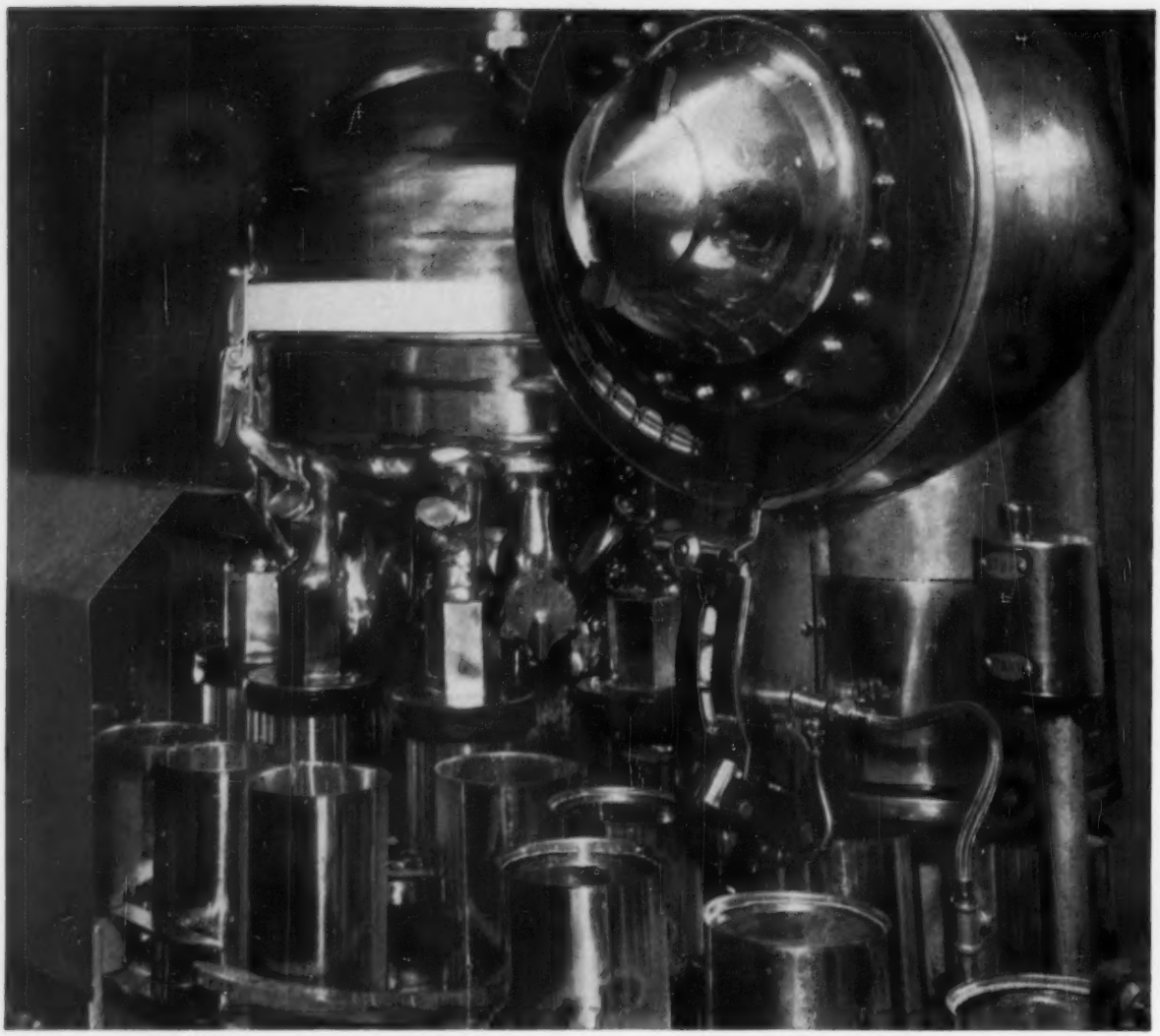

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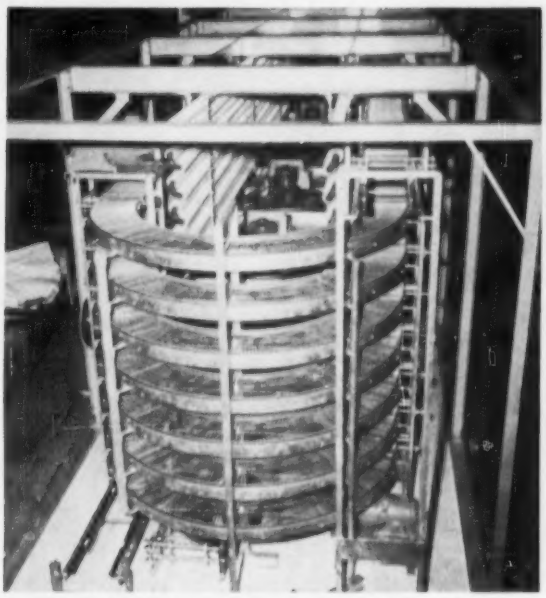
NEW EQUIPMENT & SUPPLIES



New Units Freeze, Store, and Defrost Baked Goods

This three-component freezing system offers the baker numerous economic advantages through storage of baked goods for prolonged periods.

Thus, daily sales demands can be met accurately, stale returns reduced, and week-end labor problems equalized. Furthermore, with an inventory of fresh product always on hand, "holiday rush" and shortages are eliminated.

The installation, known as Continuous Food Freezing System (York-Union), consists of three basic units: A conveyorized, continuous freezer (right photo); a holding or frozen storage room, and an air-conditioned defrosting system. Components usually are placed in side-by-side arrangement, but since plant requirements vary, units are designed to meet specific needs.

In operation, fresh sliced and wrapped loaves first enter the freezer, which operates at −30 F. They travel through the freezing zone by spiral conveyor (Wendway), specially designed for low-temperature operation. A battery of fans circulates the cold air for efficient heat transfer, and frozen loaves emerge automatically, ready for storage or shipment.

At this point, they may be conveyed directly into the adjacent holding room, where frozen loaves are stored in relay racks or baskets. Alternately, they can be sent directly to refrigerated delivery trucks.

For defrosting, racks of frozen loaves are taken out of the holding room and placed in the defrosting system. Here, a special conditioning unit supplies fresh, warmed air at the proper humidity. Product is quickly defrosted without affecting physical characteristic of the loaf, or appearance of the wrapper.

Units (left photo), are insulated with an efficient wall-panel material (Hasko-Struct). This consists of a 6-in. core of expanded polystyrene (Styrofoam) to which panel surfaces (Fiber-Glas) are laminated. Tests show that with a 110-deg. differential (−30 F. inside, and −80 F. outside), ambient temperature of the outside panel surface is less than 2 deg. below that of the adjacent air.—*Union Steel Products Co., Albion, Mich.*

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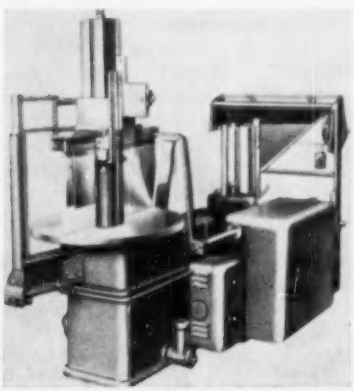

Versatile Bag Packager Forms, Fills, and Seals

This basic bag-packager, especially designed for sequence operation, produces flat bags from roll-stock packaging films such as polyethylene, Pliofilm, Saran, and Mylar.

In addition, new unit (Campbell-Pak) permits filling of the bag and complete sealing at speeds up to 40 per min.

As bag is formed and completed, it is held open in a vertical position, thus can be filled either automatically or manually with liquids, powders, or solids. Machine may be coordinated with various types of commercial fillers, as well as with the maker's filler attachment.

Acting as a self-integrated unit requiring only one operator, it handles conveying of filled bags and top sealing. Further, it can be instantly adjusted for bag size and operating speed. Various thickness of film up to 6-mil polyethylene can be used, and bag sizes range from 1x1 in. to 14x24 in.—*Hudson Sharp Machine Co., Green Bay, Wis.*

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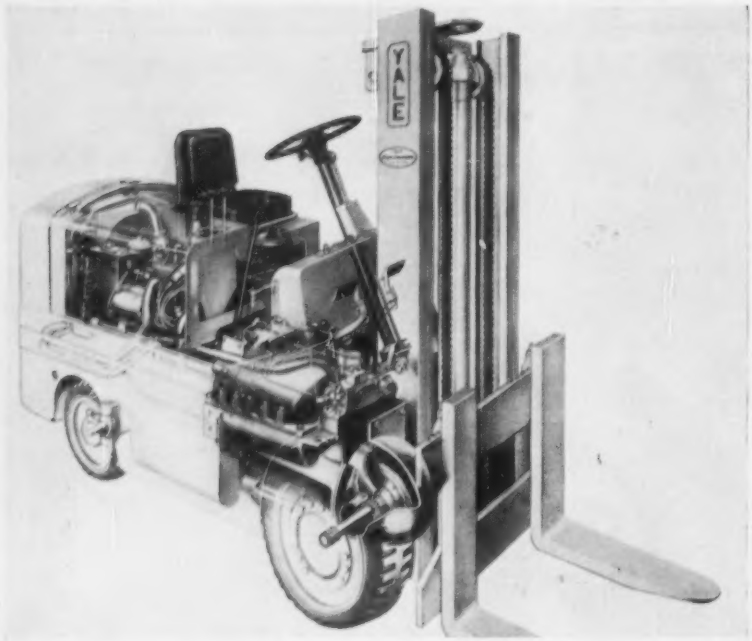

Lift Truck Has Automatic Torque Transmission

For faster, smoother materials handling with greater operator comfort and safety, this new line of fork trucks is equipped with torque transmission.

Built in capacities from 3,000 to 8,000 lb., units (KGA51) are said to provide automatic response to every power demand in lift-truck operation. Since torque multiplies in infinitely varying ratios, the transmission automatically puts the truck in the most suitable ratio relative to load and speed, thereby eliminating engine lugging.

Transmission overheating is curbed by the combination of a large oil reservoir, oil lines run through an auxiliary radiator, and fins applied to the lines. Clutches, necessary to accomplish directional changes, are oil-cooled and hydraulically operated. All transmission gears are in constant mesh with wide-face helical gears used for greater strength and quiet operation.

Oil pressure is provided by an easily serviced externally mounted pump equipped with a relief valve. For further ease of maintenance, entire transmission unit can be removed from the truck without disassembly. In addition, clutch disks may be replaced without removing major components, since they are easily accessible when transmission housing is uncovered.

All trucks have inching control for accurate maneuvering. A slight depression of the brake pedal reduces pressure on the clutch. This causes a partial separation of the plates which reduces power to the drive wheels. As the inching control is in the same circuit as the brakes, further depression of the pedal applies the hydraulic brakes. Dual brake pedals enables driver to operate inching control with his left foot, while right foot depresses accelerator for faster lift or attachment action.

Extra visibility is afforded by a lowered cowl which still provides ample protection for the driver. And seats have been lowered to place the operator in a more comfortable and safer position. Controls are easily accessible, but out of the way of a person mounting or dismounting the truck.—*Yale & Towne Mfg. Co.*, 11,000 *Roosevelt Blvd., Philadelphia* 15.

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Gums Curb Separation In Chocolate Syrup

A standardized blend of vegetable gums is said to produce desired viscosity in chocolate syrups made with or without milk solids. In addition, it prevents "mottling" and separation of cocoa, and does not mask flavor.

Material (Unex-50) is used at the rate of 15 lb. per 1,000 gal. of syrup containing milk powder. In syrups without milk, 10 lb. per 1,000 gal. usually is sufficient unless heavier body is required. Then, more is used.

Stabilizer can be introduced into the mix at any convenient point. Preferably, it is added before heating to insure proper dispersion and heating time. If agitation is good, material can be added as is. Otherwise, it should be mixed with 2-3 times its weight of sugar.

After all ingredients are in, batch is heated to 200 F. and held for 10 min. to insure solubility of gums. Syrup is then cooled to about 130 F. before filling.—*Uni-Gum Corp.*, 75 *West St., New York City* 6.

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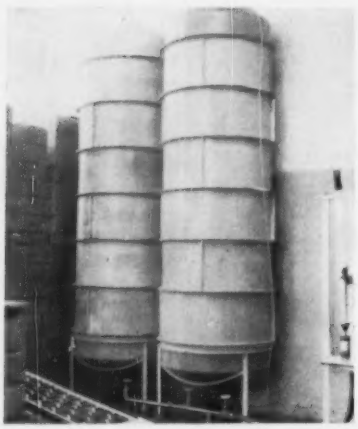

Variety of Sanitary Tanks Made of Plastic Sections

Assembled from units of cured glass-reinforced polyester resin, these tanks offer light weight, corrosion resistance, and desirable mechanical properties.

Known as Polybilt, sections may be used for vertical or horizontal assembly of tanks—open or closed, with dished or flat ends, and with or without baffles. Fittings are located as usage requires. Versatile sections permit about 50 variations in style and volume of tank.

Units are bolted together circumferentially, while Neoprene gaskets make joints leakproof. Or, catalyzed polyester resin can be employed to form a rigid permanent bond. In that case, use of one gasketed joint obviates need for a manhole.

Plastic's tensile strength is some 20,000 psi., and Young's Modulus is about 1,500,000. Material can be deflected to the rupturing point without taking a permanent set, thus is not dentable. Tanks may be used in continuous service with liquids up to 200 F., and to 225 F. intermittently.

Resistance to saline solutions, dilute mineral acids, and mild alkali is termed excellent, while special coatings can be applied for handling of more corrosive products. Inert to water, foods, and fruit acids, the resin may be steam cleaned and treated with disinfectants.—*Copolymer Corp., 3716 W. Jefferson Blvd., Los Angeles 16, Calif.*

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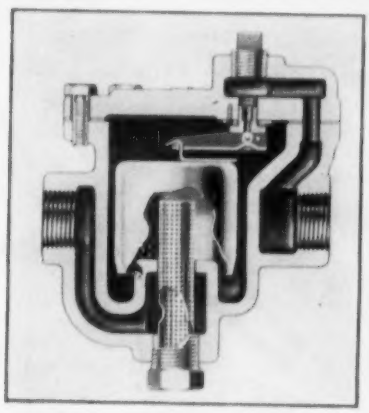


Trap's Valve Mechanism Curbs Loss of Prime

High discharge capacity and quick opening are advantages cited for a new line of inverted bucket traps. Further, they are especially designed to retain priming condensate under difficult operating conditions—light loads, rapid pressure drops, and partial vacuum in the return line caused by night shutdown.

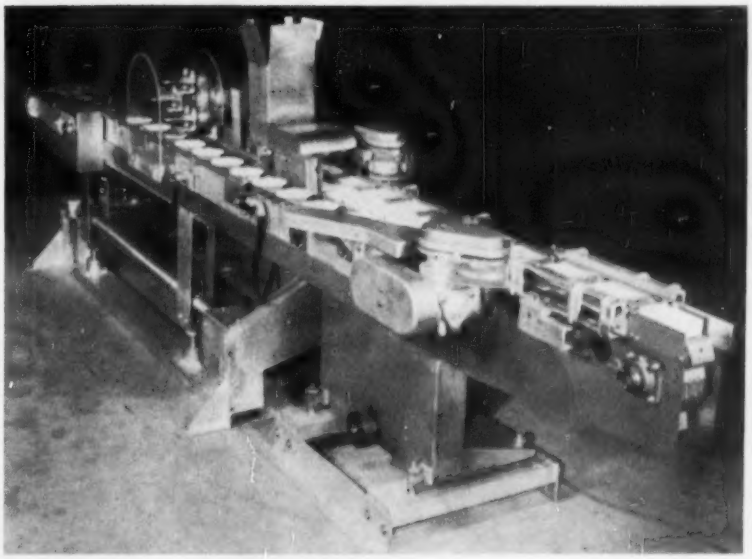
Called Type B, units employ large valves. These are operated by a new mechanism (Camlift), which provides the force needed to open large valves against steam pressure without making the trap bulky.

In operation, the bucket loses buoyancy and sinks when sufficient steam leaks through its vent. Weight of the bucket pulls on the far end of the bucket arm. This acts as a lever to pry the valve head off the seat, where it is held by steam pressure.

Cams, serving as fulcrum points, multiply the force to lift the valve head immediately. A slot permits it to drop away from the seat, leaving it wide open for maximum discharge capacity.

Units are available in sizes from ½ to 2 in. for pressure differentials up to 250 psi., capacities up to 20,000 lb. per hr.—*Sarco Co., Inc., Empire State Bldg., New York City 1.*

Circle 133A on Reader Service Card



Pie-Packaging Machine Is Fully Automatic

This horizontal-type unit, developed for automatic packaging of frozen meat specialties in pie form, offers speeds up to 200 per min. And only one operator is required.

Handling maker's multiple-lock tab cartons, machine (Marapak-H) is powered by a 3-hp. variable-drive motor. Latter operates both the packaging and pie-making equipment. Packager is magazine-fed and designed for automatic hookup to Colburn or Mayfair pie machines.

In operation, unit sets up cartons automatically. A built-in indexer receives 5-in. pies in double file and smoothly transfers them into single file. An automatic tamper-perforator levels and perforates the top crust. Pies then move by a guided conveyor.

They are inserted into moving cartons by angularly positioned moving chains. A "no-pie-no-carton" mechanism eliminates empties to cut carton waste. Filled cartons are locked on each end by stationary plows while being held in line between lugs to curb operational damage. Tapered end flaps eliminate overhanging edges to facilitate neat overwrapping.

Carton's heavy interior wax surface permits easy stripping of the frozen product, while its light exterior wax reduces machine rub-off and wax buildup. Machine is available on a lease basis from—*Marathon Service Co., Menasha, Wis.*

Circle 133B on Reader Service Card

Fast-Closing Gas Valve Eases Boiler Control

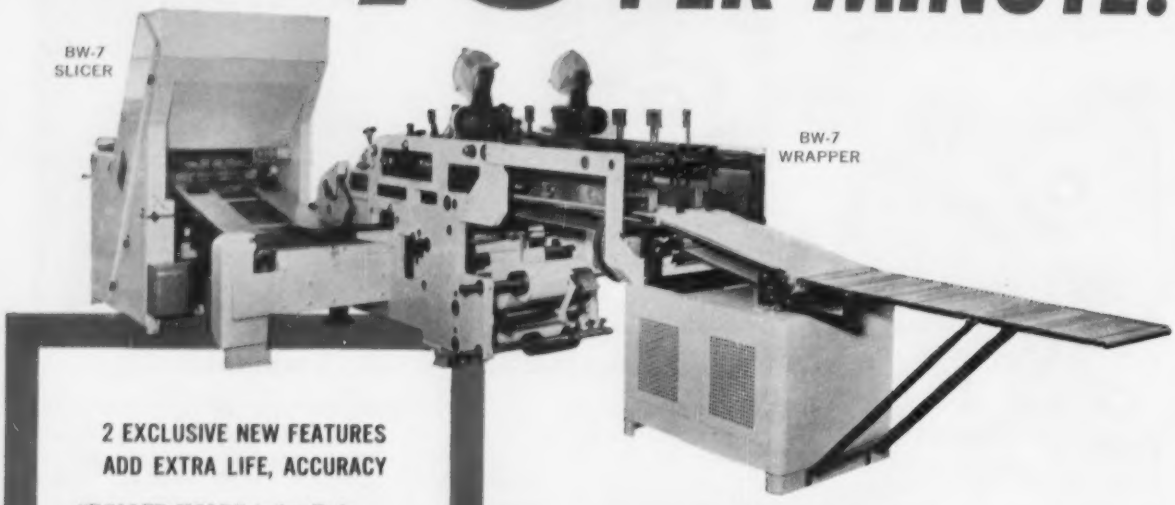
Supply of gas to industrial burners, with or without dampers or louvres, may be efficiently controlled with this improved fuel valve.

Unit (H-Series Hydramotor) is available with quick or slow opening, and closes in 1 sec. or less in no-lag response to sensitive limit control or power failure. Entire actuator and bonnet assembly is rotatable for best location of damper arm. Single-seat design offers tight shutoff.

All parts inside the cast-iron body are aluminum or stainless steel for corrosion resistance.—*General Controls, 801 Allen Ave., Glendale 1, Calif.*

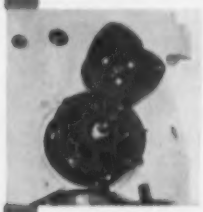
Circle 133C on Reader Service Card

Slice and Wrap up to 75 LOAVES PER MINUTE!



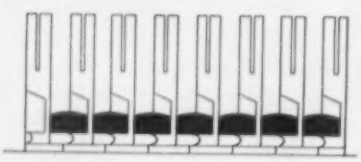
2 EXCLUSIVE NEW FEATURES ADD EXTRA LIFE, ACCURACY

"ROLLER-HOLD" Action Ends Geneva Backlash On Wrapper



Action of cam, rolling between stationary posts, restrains wrapper's mechanism as each loaf feeds in from slicer. There's nothing to wear, nothing to lubricate. Backlash found with old, Geneva-type action is entirely eliminated.

New "ACCORDIO" Blade Spacer



Controls slice thickness on BW-7 Slicer. Compressible rubber rings in blade spacer mechanism permit instant size changes, insure accuracy. Special electronic knife brake gives instant stops.

New High-Speed NATIONAL Units Handle Widest Range Of Sizes Ever

Wrap Loaves 6" to 18" Long, 2" to 7½" Wide, 1" to 6" High

These new units give you fastest slicing and wrapping . . . and the widest range of loaf sizes . . . ever offered in bread machines.

The new BW-7 WRAPPER features:

Speed-wrapping—25 to 75 loaves a minute. Handles conventional heat-sealing materials . . . with quick size adjustment and no-crush, self-measuring paper feed.

2-way sealing—Specially curved plate and flexible sealing fingers combined with conventional bottom plate to insure perfect sealing of hollow-bottom as well as regular loaves.

Extra-long refrigerated plate—Over 4 feet long, insures good sealing. Individual handling of each loaf from elevators, folders, sealers, coolers to end of machine eliminates side belts, top pressure belts.

Sealed ball bearings on all load-bearing shafts reduce maintenance and end grease leaks. Corrosive surfaces specially treated.

The new BW-7 SLICER gives you:

Faster slicing—up to 80 loaves a minute.

Block feeding—Loaves enter slicer without separation, assuring maximum cutting time for knives.

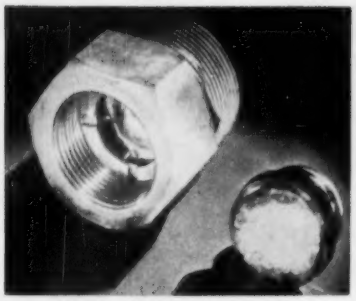
Electro-mechanical flow control with unique new guiding finger separates loaves after slicing, guides them to wrapper conveyor without doubling or flight riding.

Same ball bearing mounts as on the BW-7 Wrapper. Extra sanitation, too, with chain mesh conveyor and hard rubber feeder belt to knives. Special finish on exposed surfaces.

To get full details on these new, *high-speed* units, or on the full line of National bread machinery, contact your nearest representative.

NATIONAL BAKERY DIVISION
EAST LONGMEADOW, MASSACHUSETTS
NEW YORK • PHILADELPHIA • BOSTON • CLEVELAND • CHICAGO • MINNEAPOLIS • ATLANTA
DALLAS • DENVER • LOS ANGELES • SAN FRANCISCO • SEATTLE • TORONTO

PACKAGE MACHINERY COMPANY



Indicator Gages Moisture In Packaged Dehydrates

Employing silica gel as a dessicant, this new type of indicator is recommended for special dehydrated packaging involving pressure or vacuum, and requiring a visual means of checking on relative humidity within the container.

Designated Bull's Eye Indicator, it consists of a glass receptacle for blue indicating silica gel, which gradually turns to pink as moisture is adsorbed. Device has a rubber gasket and can be fitted into a metal housing (not supplied with indicator) in the packing container. This permits the indicator to be fastened to a nipple welded to the container shell.

A tight seal is provided against moisture infiltration or loss of pressure or vacuum. Nevertheless, air within the container circulates freely through the gel by way of holes in the back of the receptacle, permitting easy visual check on moisture conditions.—*Davison Chemical Co., Baltimore 3, Md.*

Circle 135A on Reader Service Card

Combustion-Type Heater Warms Auto Quickly

A new automobile heating system, completely independent of car's engine or coolant, is designed to deliver fresh, heated air from outside almost instantly. Further, it automatically holds a pre-selected temperature from 65 to 180F. regardless of speed or outside temperature.

Quick heating is particularly desirable in modern cars, all of which now use overhead-valve, high compression engines. Their slow warmup and high operating efficiency mean less heat rejected to the engine coolant. As a result, less heat is available for passenger comfort, particularly in stop-and-go, short-distance driving.

By not "robbing" the engine of heat needed to maintain efficient operation, this system (South Wind) permits maximum fuel economy and engine efficiency. It will be available for use as optional factory equipment on two '56-model cars. Maker states that it is four times faster in heat delivery and 60% hotter than previous designs.

Unit uses car's existing heat-distribution system. Located under the hood, it has its own fuel pump, combustion-air supply, and continuous spark ignition, thus does not depend on engine operation. System can be turned up to deliver 180-deg. heat for quick de-icing of windshields, or for quick warmup of a cold car. Moreover, air in the car can be replaced every 60 sec.

In cold-chamber tests, a ¼-in. coating of ice was cleared from a windshield in less than 3 min., with outside temperature at −30F.—*Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14.*

Circle 135B on Reader Service Card

Ultrasonic Unit Accurately Gages Liquid-Flow Rates

A different type of flowmeter—an ultrasonic device—is designed to accurately measure either mass or volume flow of virtually any fluid, regardless of its electrical conductivity and without affect by other variables.

Pressure drop across the unit (Ultrasonic Flowmeter) is practically zero. Built into a short pipe section, it has no restrictions or moving parts to obstruct flow or cause clogging. Rate of flow is measured by two transducers, each of which transmits and receives controlled pulses of ultrasonic energy across the pipe section—one diagonally upstream, the other diagonally downstream to sense difference in number of pulses received.

An increasing flow rate ups the down-stream pulses and decreases the upstream ones. Repetition rate of these pulses (a patented feature) cancels out sonic velocity by heterodyne techniques, leaving only the difference in repetition rate which is proportional to flow velocity. System nullifies effects of temperature and density on sonic velocity, while variations due to pressure, viscosity, gas bubbles, solids in suspension, electrical conductivity, or position of installation are also eliminated.

An amplified automatic gain-control circuit prevents triggering of the ultrasonic transmitter by small reflected or other noise pulses, thus allowing for a large percentage of beam dispersion by solid particles or air bubbles.

Staley's® PRODUCTS FOR BETTER FOOD PROCESSING

Zest Locks Flavor in Heat 'n Serve Dinners!

Zest holds fresh, tasty goodness in new, popular mealtime treats . . . never lets a flavor fade!

Delightful, deep-sea fresh fish sticks . . . naturally tasty, convenient frozen dinners . . . these are fast moving, profitable items high on grocery lists today. Competition is keen in these new fields, and you need wholesome, naturally fresh flavor to build lasting brand loyalty. Staley's Zest MSG is famous for building better flavor in frozen foods. Zest *never lets a flavor fade* . . . protects freshness and taste from damage during processing, brings out flavor perfection all the way to the dinner table, prevents "steam table fatigue." Zest is easy to use, too . . . you just add it like salt. Start boosting profits now with Staley's MSG. See your Staley representative or write today for more information.

STALEY'S 99+% PURE Zest® MONOSODIUM GLUTAMATE

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PRODUCTS FROM CORN
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OTHER QUALITY PRODUCTS
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Regular, Intermediate Corn Syrups
Soy Flours • Starches
Corn and Soybean Oils

This also automatically adjusts for variation in sonic attenuation caused by different fluids.

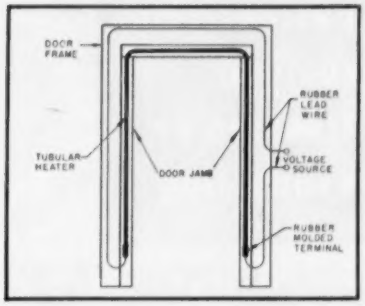
A third transducer, acting alone, may be added to the volumetric flow-rate meter to give density measurements, thus converting the instrument into a mass flowmeter. This automatically compensates for density variations, and permits use of the same pipe for accurate control when switching to a new material. Conventional voltage indicators may be used for either the volume-flow or mass-flow output signal.

Moreover, totalization of mass transferred may be accomplished by integration of the gravimetric rate signal, using built-in analog computer.

Compacity is up to 12,000 lb. per min., with a density range of about 2.5 to 1. Unit can be adapted to any standard pipe down to 2 in. Standard temperature and pressure limits are −50 to +225 F., 150 and 300 psi., with special provisions available for higher ratings.

Flowmeter may be of steel, bronze, aluminum, stainless or other material depending upon corrosion-resistance requirements. Rangeability is 20 to 1 minimum, linearity is within 1% of full scale, and accuracy is better than 2% of full scale.—*Fischer & Porter Co., Hatboro, 35, Pa.*

Circle 135C on Reader Service Card



Heating Elements Prevent Freezer-Door Binding

Small controlled amounts of electric heat, applied to door jambs of walk-in freezers, can be used to prevent door liners from freezing to the jamb. Thus, forced opening of ice-bound doors, which results in costly maintenance to doors, door-liners, and hinges, may be eliminated.

In a typical installation, electric tubular all-metal heating elements (Chromalox) are used inside the door jamb, directly opposite the liner-seal (see diagram). Part of the old door frame is removed and replaced with angle-iron sections containing the clamped-in or brazed-on tubular element. A voltage regulator and on-off switch, located outside the door, maintain a narrow strip of heated surface at about 40 F.

The thin, fully enclosed element heats up quickly, is shockproof, and cannot be penetrated by frost or moisture. With this arrangement doors open easily. And operating cost of low-wattage element is termed negligible even under constant usage.

Basic unit can be adapted to almost any door design, and usually requires from 200 to 300 w., or about 15w. per ft., operating on 115-120 line voltage.—*Edwin L. Weigand Co., 7500 Thomas Blvd., Pittsburgh 8.*

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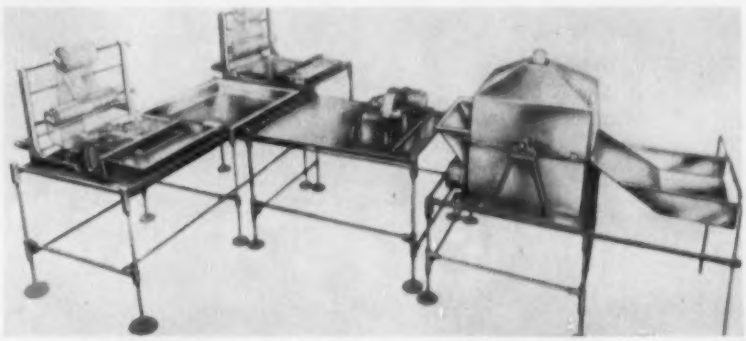


Unit Shrink-Wraps Cheese Loaves at 1,000/Hr.

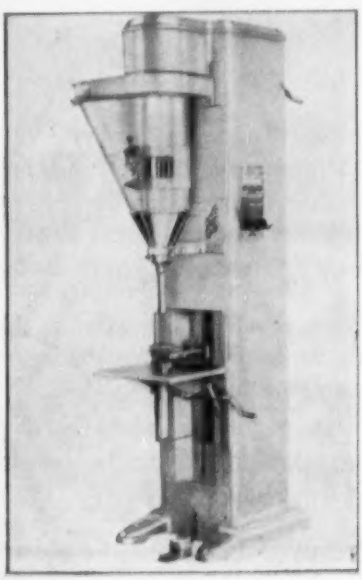
This double-wrapper installation is designed for mass-production packaging of loaf cheese and other dairy products by a method called Twistite/Shrinkwrap. Employed are heat-shrinkable films—such as cross-oriented Pliofilm, Saran, and Mylar—that are non-permeable to air and moisture transmission.

Basic equipment consists of two wrappers, one twister, and one shrinker. Production is up to 1,000 packages per hour, depending on the product. Three operators are required, two on the wrappers and one to handle both twister and shrinker.

Process involves three simple steps. First, the wrapper bands the product, then the twister end-seals the package spirally. It is next submerged in the shrinker containing 180-210 F. water.

As the film wrap shrinks, air is expelled from the package and the wrap assumes and retains the shape of the product.—*Amsco Packaging Machinery Leasing Corp., 31-31 48th Ave., Long Island City 1, N. Y.*

Circle 137B on Reader Service Card



Fills Variety of Items By Four Methods

Redesigned for volumetric filling, pressure packaging, gross weighing, or combination auger vacuum, this filler has a new driving mechanism with 40% fewer working parts.

Handling powders, pastes, and granular products by any of the four filling methods, its capacity ranges from ½ oz. to 5 lb. Micrometer-adjustment control offers accurate fill of cans, jars, boxes, or bags.

Called Model E.G., its driving mechanism is above the filling station to provide maximum cleanliness. Totally enclosed gears run in oil for quiet operation. There are no cams or sprockets, and the magnetic clutch is self-adjusting.

Auger speed is quickly adjustable from 500 to 1,000 rpm., while filling

Drenched WITH TEMPERATURE...

BY THE "ATOMIZED SPRAY" OF THIS *B-W VORTEX* PROCESSOR

for efficient pasteurizing, cooling, freezing or exhausting

This flood of finely sprayed water provides the most efficient and effective means of heat transfer. B-W's exclusive wide-opening, high-pressure spray heads are designed to provide absolute control of temperature.

This "precision processing" made possible by Vortex Processors protects the quality of your product . . . assures complete uniformity . . . eliminates spoiled batches. Even with unskilled workers, the simple and accurate automatic controls of the Vortex assure dependable quality control.

Find out why the Vortex is becoming so popular in the food processing industry. Write today for complete details and technical data.

336

BARRY-WEHMILLER MACHINERY CO.

4660 West Florissant Avenue • Saint Louis 15, Missouri

cycle can be pre-timed to pace operator from 15 to 30 units per min. through a wide range of package sizes and types.—*Stokes & Smith Co., 4992 Summerdale Ave., Philadelphia 24.*

Circle 137C on Reader Service Card

Pilot Hand Packager Speeds Test Runs

Developed to meet food industry requirements for short runs, test packaging, and promotional sales, this new hand packager reportedly is well suited for multi-unit cartoning of canned foods.

Known as Cluster-Pak "Midget," unit handles from 7 to 10 cartons per min. It is designed to carton 5 to 12-oz. cans in single rows of 2 to 6 cans, or double rows of 4 to 12 cans. Machine uses makers cartons (Cluster-Pak), a self-locking unit requiring no glue or staples.

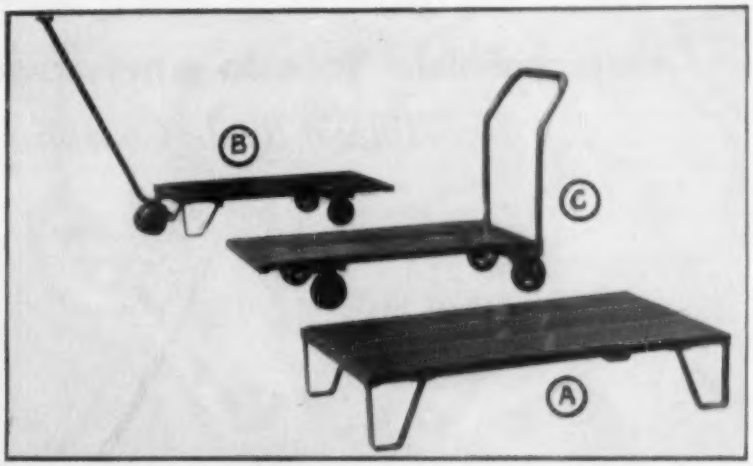
Packaging is termed simple. Operator feeds cans along a guided track into wrapping position. Then she slides a carton blank through guide rails, folds it around the cans, and pushes carton into locking position.

At the same time, she presses a foot pedal that automatically tightens and locks the carton, and reaches for another group of cans to start a new cycle. Entire operation takes 6 to 8 sec.

Furthermore, extra speed may be obtained by increasing the number of cans in a row, and by using a perforated package. Latter can be separated into 2-, 3-, 4-, or 6-can packages as desired.

Unit requires no installation time, occupies about 3 sq. ft. of floor space, and stands 52 in. high. Depending on number and size of cans per package, overall length is 30 to 60 in., overall width 15 to 30 in.—*Atlantic Paper Co., 950 W. Marietta St., N.W., Atlanta 2, Ga.*

Circle 139A on Reader Service Card



New Skids, Floor Trucks Offer Welded Construction

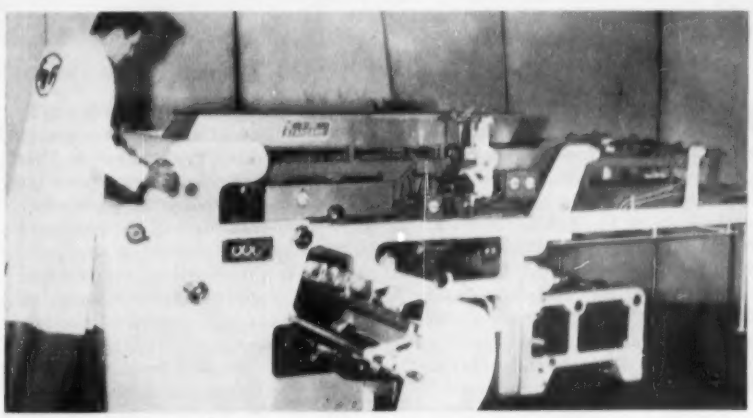
All-steel skids, semi-skids, and floor trucks of this new line (Marforge "LC") have welded longitudinal panels engineered for maximum strength, versatility, and cleanliness.

Skids (A) provide four-way entry for lift trucks, and can be stored on end because legs are built flush with edges of the skid. Types suitable for use with either hand-lift or fork-lift trucks come in sizes from 24x30 in. to 48x72 in., with standard underclearances from 3½ to 12 in.

Semi-skids (B), on the other hand, offer additional advantages of greater mobility and versatility. They can be used with lift trucks or jacks, and are available with stake sockets for conversion to shelf units.

Floor trucks (C) have longitudinal panels and outside stake sockets for maximum deck utility. Wheels are smooth rolling and durable. Decks are offered in sizes from 24x36 in. to 42x72 in.—*Market Forge Co., Materials Handling Div., 35 Garvey St., Everett 49, Mass.*

Circle 139B on Reader Service Card



Bread Wrapper Has Pushbutton Power Adjustment

Significant production economies are said to result from improvements in this high-speed bread-wrapping machine, called Model 3-122.

A push-button power adjustment permits automatic, accurate, and rapid positioning for packaging of loaves from 6 to 17 in. long, up to 6 in. high, and 8 in. wide. Package height is automatically adjusted for by a new end-label sensing device.

The entire table mechanism is simplified through elimination of the gap closer, while the loose-wrap roller has full trim adjustments. Each wrapper fold is progressively heated over a longer period for tight seals. In addition, control of bottom lap and location of end label offer a tighter, more appealing package.

Other innovations include: A 50% reduction in pre-startup time through fast-acting heater and sealing units (Polar-Seal); second, third, and fourth

"TIMKEN® bearings contribute to dependable Toledo performance"

... says Toledo Scale Company

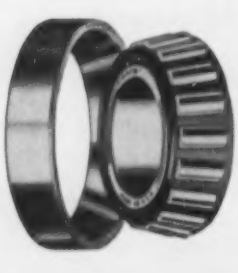
How **TOLEDO SCALE COMPANY** mounts the knife shaft of its Model 5400 slicer on Timken bearings to assure accurate slicing, long life.

BY mounting the knife of the Toledo Model 5400 Slicer on Timken® tapered roller bearings, Toledo engineers have cut service problems to a minimum. Here's why: The tapered construction of Timken bearings enables them to take radial and thrust loads in any combination. Line contact between rollers and races holds the shaft in rigid alignment, prevents wobble. Wear on moving parts is minimized, reducing the risk of breakdown and expensive maintenance.

In addition, Timken bearings hold the shafts concentric with the housing, making closures more effective. Dirt and moisture are kept out. Lubricant is kept in, eliminating the possibility of food contamination. A maximum of power is transmitted to the knife because the true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction.

No matter what type of food machinery you buy or build, always specify Timken tapered roller bearings. They give you the most value because they have the most quality. One of the ways we control it is by making our own steel. We're America's only bearing manufacturer that does. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. nickel-rich Timken alloy steels.

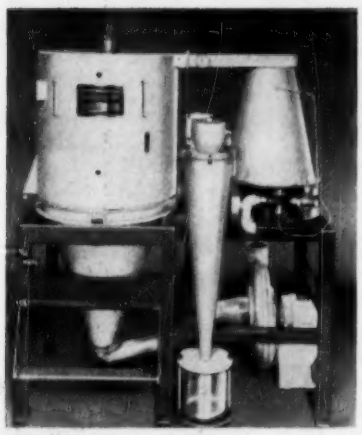
NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊕ AND THRUST ⊕ LOADS OR ANY COMBINATION

folders mounted on swing-out arm for quick, easy cleaning, and spring-loaded lifter table for uniform pressure on loose-wrap roller.

Additional economy and a clean package reportedly are obtained from a redesigned paper-roll drive. Special clutch and linkage control the upper feed roller to prevent paper pile-up when product feed is interrupted. Furthermore, use of a 14-in. paper roll permits a 30% longer run.

For safety and servicing ease, unit's mechanisms are enclosed in a steel frame which excludes crumbs and dust, and affords easy access to all assemblies. Also, the electrical system has been simplified for minimum maintenance. Drive cams, including the indexing cam, can be independently adjusted through use of separate lever mounting brackets. And folders have provision for three-dimensional alignment.—*American Machine & Foundry Co., 261 Madison Ave., New York City 16.*

Circle 139C on Reader Service Card



Increased Capacity Cited For Lab Spray Dryer

Compactly designed for rapid disassembly and easy cleaning, this new spray dryer has increased capacity for laboratory and small-lot production work.

Known as the Conical Laboratory Spray Dryer, it employs a conical bottom drying chamber and offers a choice of nozzle or centrifugal atomization, or both.

Unit is termed especially suited for heat-sensitive materials since total treatment time is just a few seconds. Solution or slurry is fed to the atomizer where it is forced into a whirling vortex in the drying chamber. Dry solids collect in the Pyrex product receiver. Special air inlets in the drying-chamber side wall permit shock-cooling of ultra heat-sensitive items.

Also incorporated is an automatic temperature and flame-failure safety system, and two dial-type thermometers are furnished as standard equipment. Insulated stainless-steel construction is used wherever product contacts the dryer.

Drying-air rate is 250 cfm., while heat loads up to 230,000 Btu. per hr. are possible with evaporation rates up to 80 lb. per hr. Optional equipment includes a pneumatic opening device for the drying chamber, automatically controlled electric heater, and air-turbine-driven centrifugal spray machine.—*Bowen Engineering, Inc., North Branch, N. J.*

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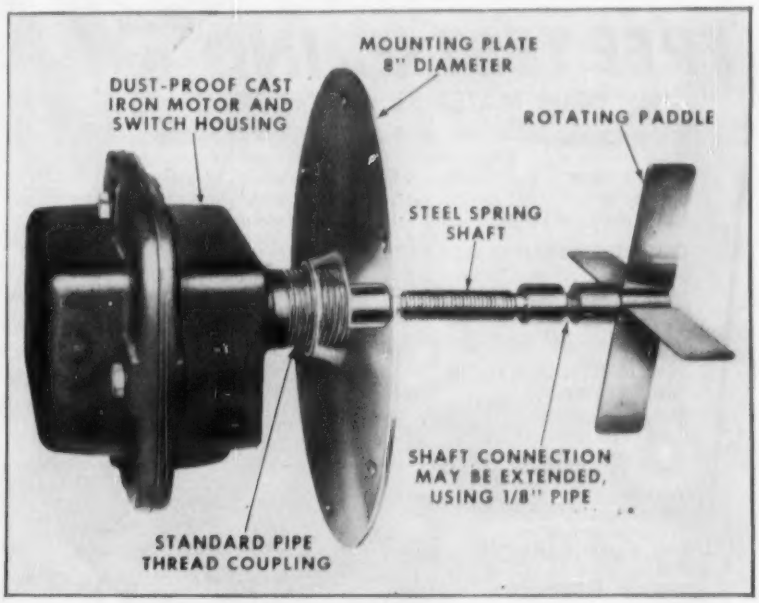
MOUNTING PLATE
8" DIAMETER
DUST-PROOF CAST IRON MOTOR AND SWITCH HOUSING
ROTATING PADDLE
STEEL SPRING SHAFT
SHAFT CONNECTION MAY BE EXTENDED, USING 1/8" PIPE
STANDARD PIPE THREAD COUPLING

Bin-Level Indicator Controls Bulk-Material Flow

Designed for use with any bulk material that flows through a bin, this new paddle-type level indicator provides automatic signaling and control in response to fluctuating bin levels.

Called Roto-Bin-Dicator, unit is termed particularly applicable to chutes or conveyors handling materials that prevent operation of a diaphragm-type device. Also, it may be installed in bins under pressure or vacuum.

In operation, a low-torque motor rotates the paddle which extends into bin on a flexible shaft. Latter may be extended to 10 ft. by attaching a section of ½-in pipe with special fittings. Shaft flexes under impact or thrust, and does not take on permanent distortion. Being flexible, it sheds top loads and retains freedom of motion.

As material builds up to level of the indicator, rotating paddle stops and motor stalls. This actuates a microswitch which, in turn, controls signal lights, bells, or conveyor motors. As level drops below the paddle, rotation resumes and switch returns to normal position.

Installation is simple, requiring only a hole in bin wall to admit paddle, then attachment of a steel plate with six screws, and connection to a power source. Mounting plate, shaft assembly, and paddle are optionally available in stainless steel.—*Bin-Dicator Co., 13946 Kercheval Ave., Detroit 15.*

Circle 141B on Reader Service Card

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what is your
PULVERIZING
problem?

accept this offer by
Schutz-O'Neill for a

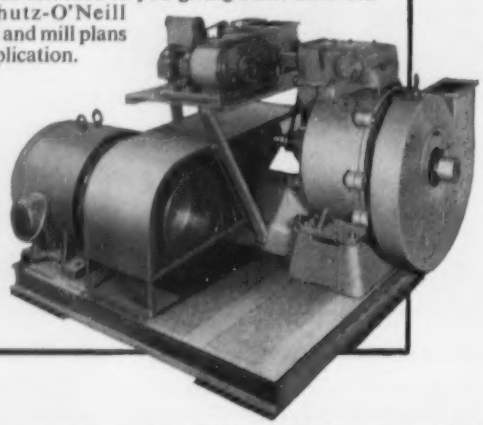
FREE TEST GRIND

OF YOUR MATERIAL SAMPLE

Without obligation to you, we'll grind a sample of your material in our Pilot plant, using a production model Schutz-O'Neill Superfine Pulverizer. This is a bonafide, no-strings offer to demonstrate to you the versatility, particle size range and capacity of Schutz-O'Neill Pulverizers. Write us for details.

OUR ENGINEERING TEST REPORT together with your processed product will be returned to you giving exact data and recommended Schutz-O'Neill equipment, methods and mill plans for your process application.

SCHUTZ-O'NEILL PILOT PLANT uses a standard production model 16" Superfine Pulverizer, which provides up to 100 different pulverizing set-ups with a grinding range from 40 mesh to 5 microns.



WRITE US FOR DETAILS OF TEST GRIND OFFER

ULTRAFINE GRINDING WITH CONTROLLED PARTICLE SIZE RANGE

You'll find Schutz-O'Neill Superfine Pulverizers best for ultrafine grinding with controlled particle size distribution—yet their versatility also makes them adaptable to the complete grinding range from coarse to ultrafine.

Many heat sensitive products can be safely pulverized, because the grinding principle of impact with air attrition embodied in Schutz-O'Neill design keeps product temperatures down and helps control uniformity.

Typical Schutz-O'Neill applications are in the paint industry; major cocoa powder, sugar, spice and pharmaceutical manufacturers; processors of emulsifier gums, resin, plastic and seaweed extract powders and a great number of others. From 62 years of continuous manufacturing and field experience, Schutz-O'Neill may already have the answer to your problem. Superfine Pulverizers are made in six sizes ranging from 7½ to 125 horsepower with grinding chambers 12" to 28" in diameter.

Tell us your milling requirement—fineness, uniformity, increased output, lower cost—send us a sample of the stock you want to pulverize, state fineness and capacity desired, or send for Schutz-O'Neill bulletin.

ESTABLISHED 1893

SCHUTZ-O'NEILL COMPANY

309 Portland Avenue • Minneapolis 15, Minnesota

PULVERIZERS
GRANULATORS
ROLLER MILLS
AIR CLASSIFIERS
SIFTERS
HAMMERMILLS

Equipment & Supplies

Plastic Stock Boxes Are Easily Cleaned

These stock boxes with matching lids are designed to protect foods during manufacture, shipping, or storage.

Made of polyester resins and glass fiber, lightweight units (No. 477) reportedly do not rust, bend, chip, or absorb odor. They are resistant to detergents and steam, while rounded corners and smooth, non-porous surface enables easy removal of food particles during washing.

Lids prevent damage to contents and keep dust out. When stacked, boxes can be moved by dolly without toppling because trays lock one on the other. Dimensions: 8¾x11¾x4¼ in.; wall thicknesses, 0.07 in.—*Molded Fiber Glass Tray Co., Linesville, Pa.*

Circle 142A on Reader Service Card

Freight Transfer Is Eased By Self-Adjusting Dock

Hydraulically operated, this 10,000-lb.-capacity adjustable ramp can be installed recessed in a dock, partially recessed, or in front of the dock for freight transfer.

Called Adjust-A-Dock (Model 6 MF), it has a manual floating device that provides a smooth, level ramp which automatically compensates for spring deflection of truck bed during transfer. Pushbutton controls operate

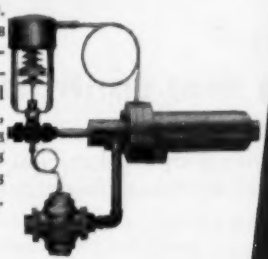
FULTON SYLPHON

TEMPERATURE REGULATOR HEADQUARTERS, U.S.A.

Here are two more reasons why engineers looking for better ways to regulate temperatures . . . look first to Fulton Sylphon. These two new Mixers combine the most modern design with the time-tested Sylphon Bellows principle of control. Both types provide close, accurate control with an automatic shut-off safety feature. Quick, easy installation involves only pipe connections. Use the convenient coupon for detailed descriptions of these new Mixers.

HOT-COLD WATER MIXER—No. 1350 Series

Mixes hot and cold water to desired temperatures. Unaffected by variations in water pressure. Provides an accurate controlled source of tempered water for industrial, chemical and food process requirements, as well as wash basins, gang showers and similar installations.



STEAM-WATER MIXER—No. 1360 Series

Mixes steam with water to provide tempered water at low cost. Steam is injected directly into the water, utilizing every BTU of heat energy. Water is heated as used; steam is consumed only when water is drawn. Ideal for industrial, chemical and food processing systems using steam.

Mr. Controls

Robertshaw-Fulton

CONTROLS COMPANY

FULTON SYLPHON DIVISION

FULTON SYLPHON DIVISION

Knoxville 1, Tennessee

Please send descriptive literature on:

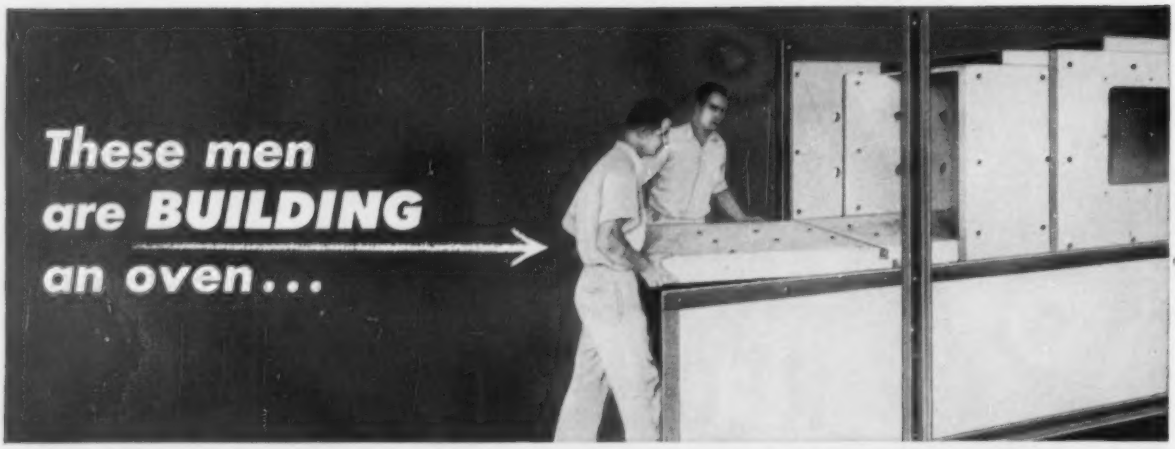
- ☐ 1350 Series Hot-Cold Water Mixer
- ☐ 1360 Series Steam-Water Mixer

Name _____

Company _____

Address _____

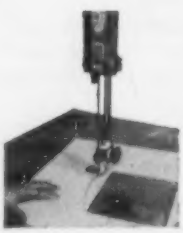
City _____ State _____



...with J-M MARINITE*—
the structurally strong insulation that controls heat to 900F

LARGE SHEETS speed construction, are light and easy to handle, provide maximum heat control.

EASY TO WORK, Marinite may be cut, drilled, and shaped with ordinary woodworking tools.



Provides economical operation. J-M Marinite permits uniform temperature control in ovens, driers and other high-temperature equipment. Low heat capacity . . . reduces heat-up and cool-off time. Homogeneous material won't bulge, settle or sag . . . eliminates "Hot spots." Outside framing cuts through-metal heat loss to a minimum.

Needs no maintenance. J-M Marinite is made from asbestos and diatomaceous silica. Unaffected by moisture . . . won't rust, rot, mold or corrode. Normally requires no protective coating. Easy to keep clean. Lasts indefinitely without replacement. Minimizes down-time.

Easy to erect. J-M Marinite builds and insulates in one operation. Easily fabricated with woodworking tools. Can be applied by your own construction crews . . . no special training needed. Goes up fast with minimum angle-iron framing.

Write for new Marinite brochure IN-153A to Johns-Manville, Box 60, New York 16, N. Y. In Canada, Port Credit, Ontario.

*Marinite is a registered Johns-Manville trade mark

JM PRODUCTS

Johns-Manville *first-in* INSULATION

MATERIALS · ENGINEERING · APPLICATION

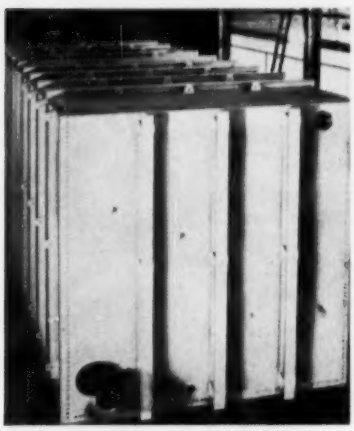
the dock and provide floating action.

In operation, deck is initially raised to clear the floor of incoming truck. After truck is positioned, deck is lowered until float arms, mounted on each side of deck, rest on truck bed. The float-control selector is then turned on and floating action automatically compensates for truck's spring action.

When transfer is completed, deck is placed flush with loading dock to permit normal cross travel.

Standard width is 6 ft. with available lengths of 5, 6, 7½, and 10 ft. Units are offered with stationary or retractable arms.—*Rowe Methods, Inc., 2534 Detroit Ave., Cleveland 13.*

Circle 1428 on Reader Service Card



Panel Fermenters Offer Operating Economy

Structural strength, ease of cleaning and inspection, and low-cost installation are offered by these rectangular panel fermeters, which have stainless-clad construction.

Vats, available in capacities to 1,500 bbl., are designed for assembly at the brewery, thus can be built to exact space requirements. Walls are reinforced with beams to provide a rigid structure. Maximum wall thickness is ¼ in. No internal tie rods or braces are required, even with open-top design.

Cat walks can be supported directly by the tanks, eliminating need for supplemental columns. To simplify cleaning and maintenance, all internal seams are welded. Gaskets separate fittings from the tank to eliminate galvanic corrosion. And manholes provide ready access from top or front.

Attemperators are engineered for cooling as specified by the brewery, and yeast chutes are available for open vats. All closed tanks have a

Use

RHOZYME

Diastatic Enzymes

for processing starch in food

You can solubilize, saccharify, or modify food starches *without* altering other ingredients by using low-cost, efficient RHOZYME diastatic enzymes.

For example: In the processing of precooked cereals, diastatic enzymes can be used to reduce the viscosity of the mash and thereby increase the efficiency of roller-drying. Sweet, nonbitter sirups can be produced by saccharifying corn or wheat starch. Bread starch, modified by treatment with RHOZYME enzymes, gives bread of better texture and grain.

If you want to improve the processing of your starch-containing foods, we will be glad to discuss with you how the *specific* and *controlled* action of RHOZYME enzymes can help.

RHOZYME is a trade-mark, Reg. U. S. Pat. Off. and in principal foreign countries.

CHEMICALS FOR INDUSTRY

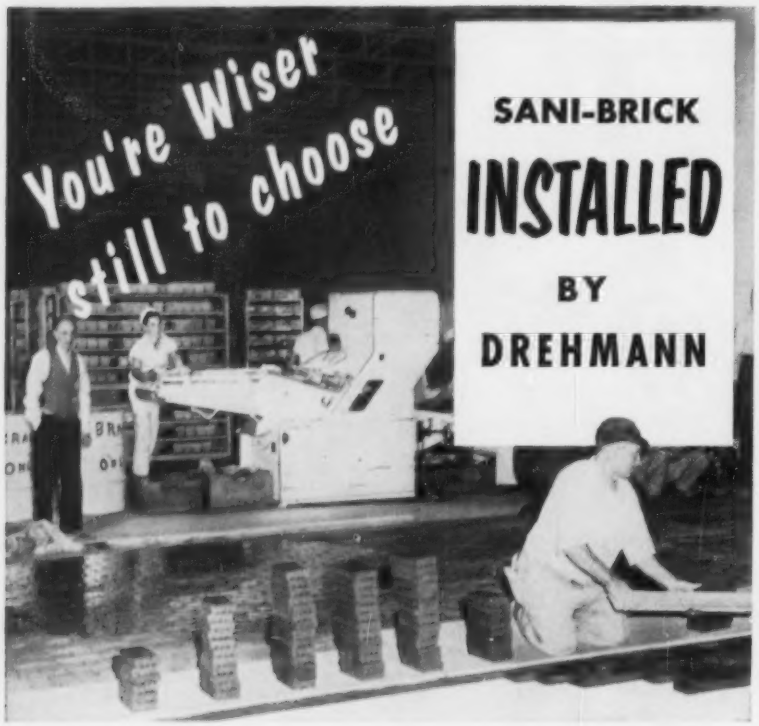
Write Department SP for full information

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

YOU'RE WISE TO CHOOSE **BRICK**



Brick is recognized as the soundest material there is for food processing plant floors. It is handsome in appearance. Has high sanitary properties. Resists acids and alkalies. Costs little to maintain.

To derive these many benefits, however, it is essential the work be done by a contractor of proved capability. The installation of brick, unlike that of other flooring materials, requires specialized engineering and highly skilled workmanship.

Drehmann—originator of brick flooring—is the most experienced flooring contractor in the food field. More than 9,000,000 square feet of Sani-Brick—many of the floors sound as a dollar after 30 years of punishing treatment—is convincing evidence of the long-life, trouble-free performance of Sani-Brick installed by Drehmann.

Consider the advantages of converting to Sani-Brick now. A floor-wise Drehmann engineer will give you the details of how Sani-Brick can be laid right over your old worn floor with little or no interruption of production.

DREHMANN PAVING & FLOORING CO.
Originator of Brick Floors • Est. 1869
GAUL & TIOGA STREETS • PHILADELPHIA 34, PA.
507 FIFTH AVENUE • NEW YORK 17, N. Y.

DESIGN • ENGINEERING • INSTALLATIONS • MAINTENANCE

DREHMANN HAS THE FLOOR FOR MODERN INDUSTRY
DREHMANN
SANI-BRICK INSTALLATIONS

Equipment & Supplies

special water seal to protect against pressure or vacuum, including connectors for handling gas to collectors or exhaust.

Rectangular design permits side-by-side installation, with the air space sealed by masking strips. Provision for ventilation and access is then at the rear. Insulation may be applied over the entire surface, or limited to the area above the cat walk. Also, stainless or plain-steel sheathing can be attached to the beams.

Vats are fabricated in flat panels. Steel plate is flanged, punched for assembly bolts, and reinforced with structural beams. At point of assembly, panels are bolted together with stainless-clad surfaces face-to-face. According to maker, knock-down shipment offers significant savings in transportation and handling costs.—*Pfaudler Co., Rochester, N. Y.*

Circle 145A on Reader Service Card

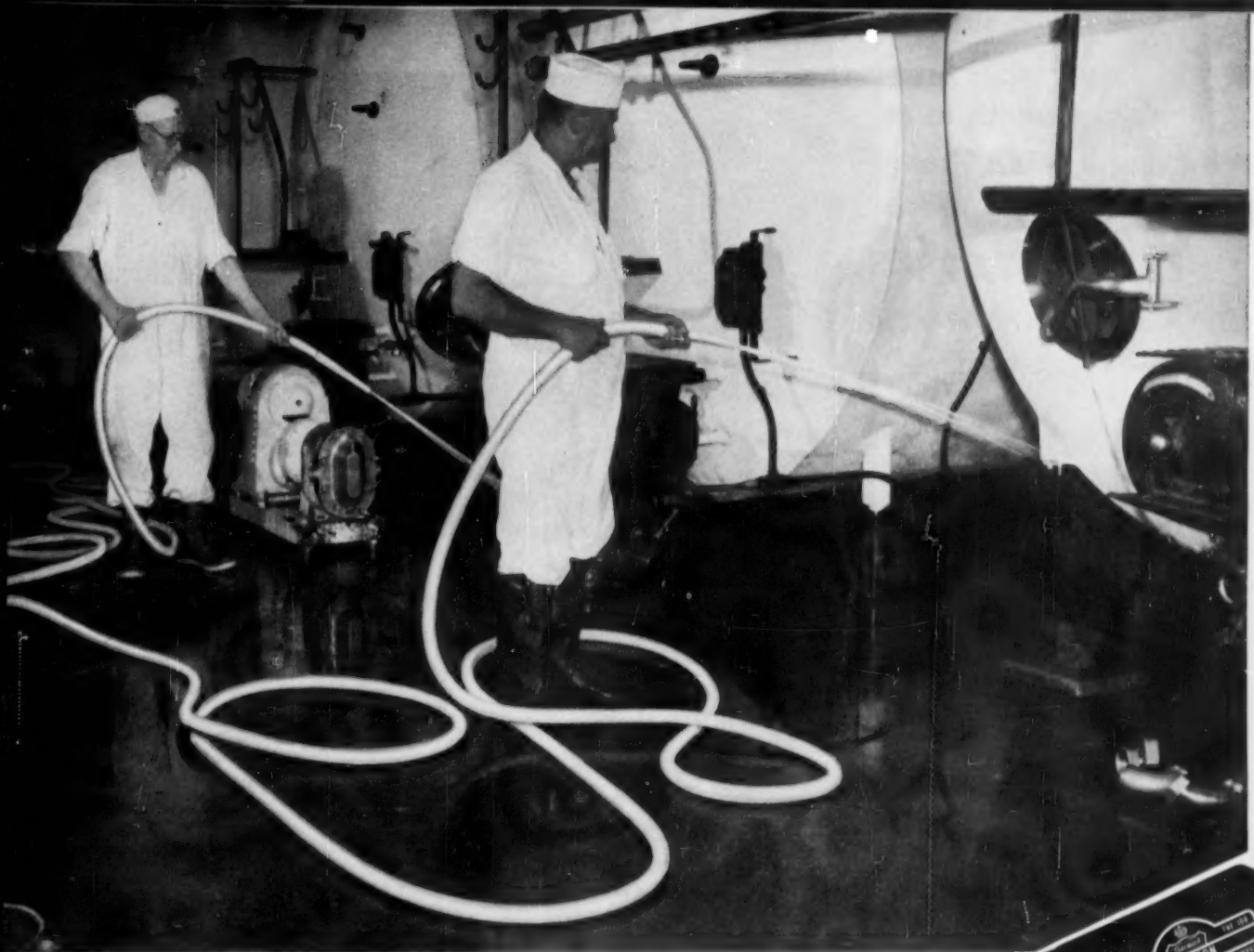
Viscosity Quickly Gaged With New Portable Unit

Process control by viscosity measurement may be sped and simplified with use of this portable viscometer.

Called Model V, it employs inner and outer rotating coaxial cylinders. Former rotates against a calibrated spring that moves a pointer over a scale to indicate viscous drag. Three speed ranges are provided by a gear-change switch. And a variety of interchangeable cylinders offer a wide range of viscosity and rates of shear.

Continuous readings may be taken without stopping the motor to change speed. This permits plotting of flow curves without interrupting shear in the sample. A fixed guard ring minimizes "end effects" to provide uniform shear.

(Turn page)



Thermoid Hose designed specifically for use in food processing plants

Thermoid designs and manufactures many types of hose for a wide variety of specific industrial applications. These 3 are ideal for use in food and beverage plants:

VERSICON most versatile hose ever developed. Handles air, water, oil, gasoline, dilute acids and gases.

CREAMERY for use with hot or cold water and low pressure steam, for cleaning and sterilizing.

BREWERS for use in breweries, wineries and food plants. Imparts no taste or odor.

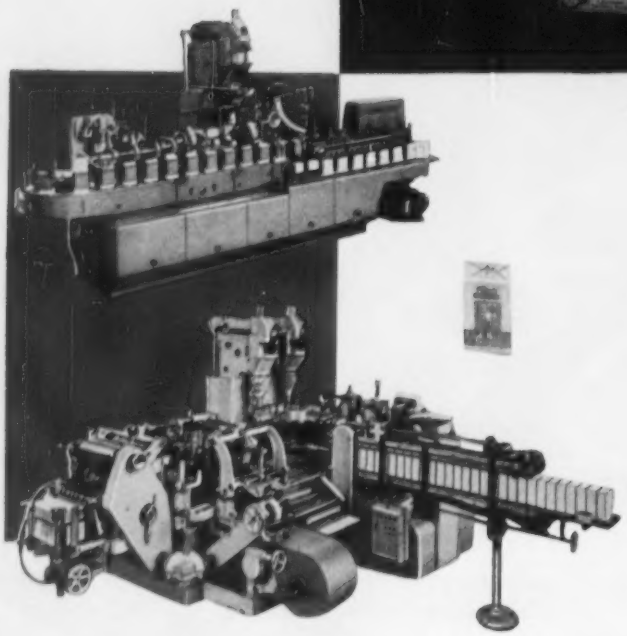
Your Thermoid Distributor carries a full line of Thermoid Hose, Conveyor Belting and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.

Conveyor & Elevator Belting • Transmission Belting
V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



We have very long experience in flour packaging and continously developed new and faster machinery from 1—5 lbs., in double and single bags or cartons, from roll, sheet or preformed container.

Individual filling,
bundling and
combined printing

is possible.

FR. HESSER

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GEVEKE & CO. INC.

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PACKAGING EQUIPMENT SERVICE LTD.

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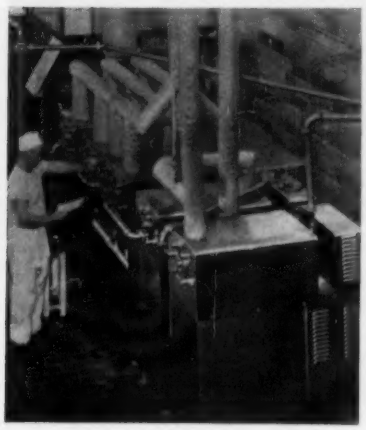
07755

Inner cylinder and attached measuring system are protected from shock, and a simple quick-release mechanism enables quick removal of cylinders for cleaning.—*Ferranti Electric, Inc., 30 Rockefeller Plaza, New York City 20.*

Circle 146A on Reader Service Card



Variety of Foods Cooled In New Heat Exchanger

Liquids, slurries, and combinations of liquids and solids may be continuously cooled in this new heat exchanger, designed to meet food-industry sanitary standards. Foods contact only stainless steel or nickel alloy.

Continuous cooling eliminates need for batch pre-cooling tanks, thus saves floor space. Production is increased by faster cooling, and labor costs are cut as cleaning time is reduced. Cylinders are easily opened for daily cleaning and rapid removal of dasher or agitator.

Product is pumped through a 1½-in. stainless-steel pipe at production-line speed without disintegrating solids or clogging the cooling chamber. Refrigerant may be Freon, ammonia, brine, or water.

Cooling capacity of unit (Entrodyne) varies with the product and cooling medium. In one installation, a battery of four ammonia and two water-cooled exchangers pre-cools the filling for 60,000 8-oz. pies in 8 hr. These machines drop the temperature from 200 F. to 38 F. in about 3 min.

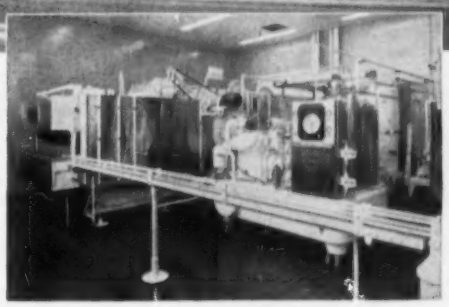
Units are available in any number of cooling cylinders, with large numbers of exchangers connected in series of four. Standard size of each cylinder is 36 in. long and 7-in. dia.—*General Equipment Mfg. Co., 1348-54 Stadium Dr., Indianapolis, Ind.*

Circle 149A on Reader Service Card

Q - What is the best way to produce high quality, thirst-quenching carbonated drinks?

A. use Vilter REFRIGERATION that *costs less to own

PEPSI-COLA'S NEW MILWAUKEE HOME



DRINK PEPSI-COLA

● Producing quality, highly carbonated drinks efficiently in today's bottling plants requires well-engineered cooling equipment to guarantee uniform carbonation. In the new Pepsi-Cola home in Milwaukee—the most modern plant of its kind in the world—Vilter equipment was selected to provide the refrigeration.

Two Vilter four-cylinder VMC ammonia type compressors, each driven by a 25 h.p. motor, are used in the Mojonnier Carbo-Cooler installation at this Pepsi-Cola plant. Syrup and water are cooled and carbonated simultaneously. The mix enters the Carbo-Cooler at 75° F. and leaves at 33° F. The Carbo-Cooler has a capacity of 260 bottles per minute!

The Pepsi-Cola plant maintenance engineer is pleased with the performance of the Carbo-Cooler which depends upon Vilter compressors for refrigeration. He states that he has never had trouble since the equipment was installed, and that it is one of the smoothest jobs he has ever handled.

Wherever you have an application in the food field, Vilter refrigeration can handle it. Meat packers, dairy operators, frozen food processors and other users of refrigeration in the food field have found it profitable to rely on Vilter. So will you!

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts...
ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, MILWAUKEE 7, WIS.

Air Units • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Water and Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice and Polarflake Ice Machines

ADD

Sustane 3-Flake

AND

MIX LIGHTLY

That's a time-honored recipe for obtaining high A.O.M. protection and solubility for your fats and oils.

The ingredients of Universal's Sustane 3-Flake are BHA, propyl gallate and citric acid in the proper proportions to insure excellent antioxidant protection. The unusual formulation of Sustane 3-Flake requires less mixing to obtain complete distribution and maximum effectiveness. This is accomplished without the use of inert ingredients.

With 67 per cent butylated hydroxyanisole, 20 per cent propyl gallate, and 13 per cent citric acid, Sustane 3-Flake is tailor-made for high A. O. M. stability with improved fat solubility.

Use of Sustane 3-Flake will convince you that it can be dissolved in fats and oils with far less mixing than is required with comparable liquid formulations. Plant experience has established this beyond a doubt!

PRODUCTS DEPARTMENT

UNIVERSAL OIL PRODUCTS COMPANY

UOP

30 ALGONQUIN ROAD
DES PLAINES, ILLINOIS, U. S. A.

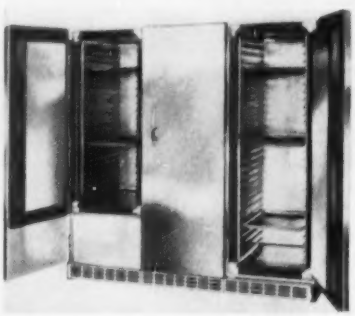
Equipment & Supplies

Automatic Bag Closer Is Flexible and Fast

Seen cutting labor and material costs of closing plastic bags is a unit that automatically ties them with maker's vinyl-covered wire tape. Speeds up to 40 per min. are reported for bags ranging in capacity from ½ to 25 lb.

Called Plas-Tie Matic, hand-fed machine cuts off proper length of tie, fastens it around bag neck, and twists ends of closure to form a tight seal. Tapes are available in various colors and may be imprinted. A strong iron wire core reportedly makes them freezeproof, waterproof, and easy to untie without damage to bag or contents.—*Plast-Ties Co., Santa Ana, Calif.*

Circle 150A on Reader Service Card



Baker's Freezer Offers Automatic Defrosting

This self-contained baker's freezer is designed for maximum space utilization, even temperature distribution, and minimum maintenance.

Known as Sta-Kold BFA-60-S, it offers an automatic hot-gas defrosting system (Thermobank, Kramer) with forced-air circulation to eliminate ice scraping. Interiors are adjustable (without tools) on 1-in. centers to take any combination of baker's pan slides, stationary or pull-out meat rails, shelves, and refrigerated drawers.

Unit shown above, equipped with

Get full use of "air rights" with Yale Trucks

ADD AS MUCH AS 100% TO USABLE WAREHOUSE CAPACITY

YALE's complete line of Electric, Gas and Diesel Trucks help you get full value from every foot of warehouse space—space you *pay* for, but cannot use with ordinary storage methods. These trucks speed up the smooth flow of products in and out of your plant with less loss from breakage... less damage to containers.

And YALE's Electric Trucks won't contaminate perishables—they're odor and fume-free... operate without heat that could promote spoilage.

YALE meets every handling need in the food industry with the most complete line of industrial trucks available—in every practical capacity —with attachments to handle all types of containers: cases, cartons, drums, bags. For help in selecting the trucks that best meet *your* food-handling needs, call your YALE representative today. Or mail the coupon below.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*Reg. U. S. Pat. Off.

Gas, Electric, Diesel & LP-Gas Industrial Trucks • Worksavers Warehousers • Hand Trucks • Hand & Electric Hoists

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 4612
Roosevelt Boulevard, Philadelphia 15, Penna.

Please send me full information about YALE
☐ Electric Trucks ☐ Gas Trucks ☐ Worksavers
☐ Hand Trucks ☐ Attachments

Company_____

Name_____ Title_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Manufacturing Co.
St. Catharines, Ontario, Canada

destination: SHOPPING BAG

DANIELS wraps have the spark that sells provisions. Ham, bacon, picnics, margarine, lard and other allied products find their way into shopping bags in a hurry when protected by distinctive **DANIELS** wraps.

Member of Wisconsin Paper Group for better Pool Car Service

Daniels
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creators · designers
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of flexible packaging

there is a Daniels product to fit your needs

SALES OFFICES: Rhinelander, Wisconsin . . Chicago, Illinois . . Philadelphia, Pennsylvania . . Akron, Ohio . . Denver, Colorado . . Dallas, Texas . . Los Angeles, California

Equipment & Supplies

83 sets of tray slides, has 60-cu. ft. capacity. There are built-in cylinder locks and die-cast handles on all three doors. Coved edges and ball corners are welded, ground, and polished for ease of cleaning.

Freezer has automatic interior lighting, and is delivered with ¾-hp. hermetically sealed compressor. Dimensions: Width, 75⅛ in., depth, 33½ in., and height, 72¾ in. Other units are available in remote and pass-through models from 15 to 90 cu. ft. in stainless steel, aluminum, or baked enamel.—*Victory Metal Mfg. Corp., Plymouth Meeting, Pa.*

Circle 150B on Reader Service Card

Cheese Acidity Tested By New pH Meter

Acidity of cheese during manufacture or curing may quickly and accurately be measured with use of a simplified pH meter employing a quinhydrone system.

Called DFL, it indicates throughout the range from pH 0 to 8, and is suitable for both "wet" and "dry" testing of hard and soft cheeses, including cottage cheese. Determinations may be made by non-technical personnel on small solid or liquid samples.

Compact equipment is powered by a single dry-cell battery.—*Dairyland Food Laboratories, Inc., Waukesha, Wis.*

Circle 153A on Reader Service Card

New Chemicals

Synthetic Calcium Silicate Is Anti-Caking Agent

A new line of synthetic calcium silicates, made by chemical combination of lime and diatomaceous silica, offers food-conditioning properties that may cut costs and improve product quality.

Known as Micro-Cel, the material

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service Postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

DOUBLE MECHANICAL SHAFT SEALS

PERMANENTLY LUBRICATED BALL BEARINGS

These two advanced features of

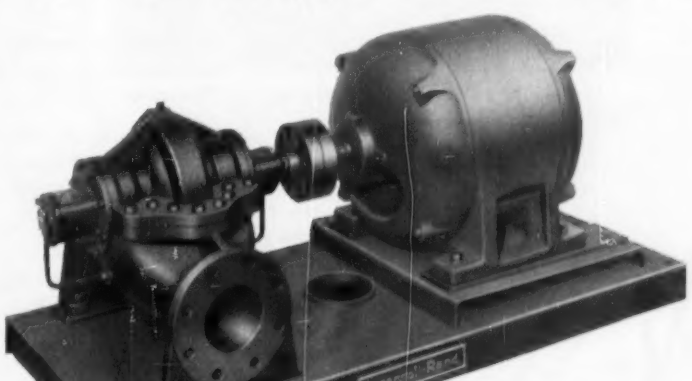
DMV-DHV PUMPS

end pump maintenance problems

Used in place of conventional packed stuffing boxes, Double Shaft Seals eliminate the need for periodic inspections and repackings. Performance-proved and self-adjusting, they require no attention throughout their entire service life.

Sealed, Cartridge-Type Ball Bearings do away with the necessity of greasing or oiling pump bearings. Here, in the DMV-DHV pump, the bearing lubricant is permanently sealed in—and assures years of successful operation.

You can install this modern I-R pump anywhere due to the greater compactness obtained with this modern construction. It is the simplest, most maintenance-free pump ever built by Ingersoll-Rand for general hydraulic service. Write for Bulletin 7248-A, or see your nearest I-R branch office.



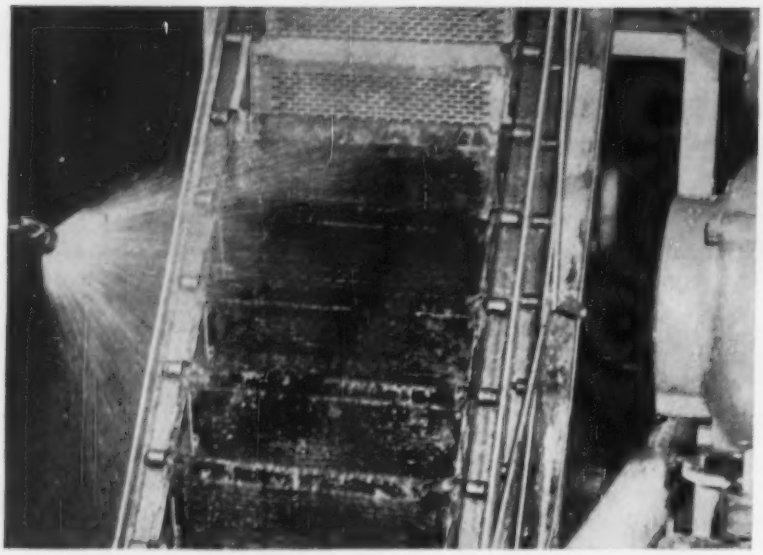
Single-stage, double suction DMV-DHV general hydraulic pumps are available for heads to 350 ft., capacities from 275 to 2400 gpm.

Ingersoll-Rand

10-288

Cameron Pump Division
11 Broadway, New York 4, N. Y.

PUMPS • CONDENSERS • TURBO-BLOWERS • COMPRESSORS • ROCK DRILLS
DIESEL & GAS ENGINES • AIR & ELECTRIC TOOLS



Here's the key to faster spray-sanitation

Now you can zip right through sanitation chores easily by putting to work one of the deadliest and fastest bacteria-killing combinations known. Oakite Bactericide is the bug-killer and the Hozon Unit is the key to quick application.

Here's the simple Oakite system for wiping out contamination. In an ordinary bucket, water-mix pre-determined ppm solution of Oakite Bactericide. Hook up your Hozon Unit between water outlet and hose. Place the Unit's small siphoning tube in solution. Turn on the water and start spraying.

Water pressure sucks the Bactericide solution through the hose and discharges it at the nozzle at the exact ppm you want. You sanitize just as you water your lawn, reaching all areas no matter how inaccessible.

Because of its low pH, Bactericide goes to work immediately beginning its killing action within 5 seconds after application. Harmful bacteria are knocked out quickly preventing costly spoilage. Bactericide and Hozon—a combination you can't beat.

And here's news. The Hozon Unit is given FREE to purchasors of either Oakite Bactericide or Oakite Sanitizer No. 1. Write today and get complete details on how you can have faster, more effective plant sanitation. FREE booklet on request. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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absorbs 1 to 2½ times its weight of liquids, thus may be used to keep deliquescent foods free-flowing in damp weather. It is also proposed for use in viscosity control and in the drying of hygroscopic liquids.

Product is a white to off-white powder. It can be made in bulk densities from 5 to 15 lb. per cu. ft., and in particle sizes from 0.02 to 0.07 micron.—*Johns-Manville, 22 E. 40th St., New York City 16.*

Circle 153B on Reader Service Card

Briefs . . .

Ice Cream Fillers automatically form, fill, and close quart and half-gallon tapered pails at up to 450 gal. per hr. —*Anderson Bros. Mfg. Co., 1907 Kishwaukee St., Rockford, Ill.* (154A)

New Hand Pump charges oil into Freon ammonia compressors, prevents admission of air into crankcase. —*York Corp., York, Pa.* (154B)

Stainless Beverage Tubing guards product purity and flavor, is strong and easily cleaned.—*Superior Tube Co., 1529 Germantown Ave., Norristown, Pa.* (154C)

New Spectrophotometer permits location of indicator up to 50 ft. away from optical unit for "in process" control.—*American Optical Co., Southbridge, Mass.* (154D)

Continuous Sugar-Coater for jellies and jubes automatically controls each stage of coating process, handles 900 lb. per hr.—*New Industrial Designs, 37-39 Shepherd St., Chippendale, N. S. W., Australia* (154E)

Dual-Titration Unit has full pH range measurable to 0.02 unit. Readings are taken from a continuously indicating meter dial, while variable-speed stirrers simplify operation.—*Precision Scientific Co., 3737 W. Cortland St., Chicago 47.* (154F)

Electric Pallet Truck employing hinged superframe also handles skid platforms. Frame, in "up" position for pallet handling, drops to accommodate skids.—*Lewis-Shepard Products, Inc., Watertown, Mass.* (154G)

Plastic Color Standards, adopted by USDA for grading of lima beans, provide accuracy and convenience in production control.—*Magnuson Engineers, 509 Emory St., San Jose 10, Calif.* (154H)

Another famous brand name cuts packaging costs with STOKES & SMITH Automatic Fillers!

At McCormick & Company, Inc.

Stokes & Smith Model HG-86-87 Automatic Tandem 4-Station Fillers have increased average accuracy of fill to consistently close tolerances. From "fluffy" cinnamon to "oily" nutmeg, they fill 120 or more containers per minute in a range of volumes from ½ to 4 ounces.

Whether your product is a sticky powder, free-flowing granules or hard-to-manage flakes, the versatile Model HG-86-87 Automatic Filler will reduce your packaging costs by increasing accuracy of fill at high speed. It fills cans, jars or cartons by volume, gross weight or auger-vacuum in sizes ranging from 1½" to 6" wide, 1½" to 4" thick, and 1½" to 8" high. It is ideally suited not only for spices and other foods but for drugs and cosmetics as well.

5 Cost-Cutting Advantages

Average Accuracy — plus or minus 1% for most products.

Versatility — handles a wide variety of products.

Adjustability — quick, easy changeover from one product or container size to another.

Speed — up to 145 containers per minute.

Cleanliness — auger, hopper, dust tube design assures dust-free fill.

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SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

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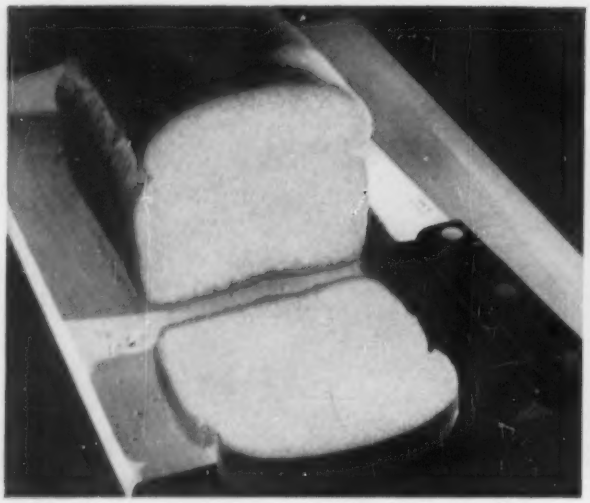

Sugar is the key to wheat flavor in bread. And of the basic sugars that nature provides, many bakers have discovered that Cerelose brand dextrose—the sugar made from corn—produces more of the finer flavor overtones in baked bread than any other sugar.

Preserving the piquant flavor of tomato products, Cerelose brand dextrose is a reducing sugar that will not mask delicate spice flavors with sweetness. Also, by retarding oxidation, Cerelose increases the shelf life of the natural red tomato color.

To boost flavor...without over-sweetness... more and more food processors are using

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THE SPECIAL SUGAR THAT DOES SPECIAL THINGS FOR FLAVOR IN FOODS

All too frequently, true fruit flavor is masked by the sweeteners in the preserving syrup. When syrup concentrations must be increased to prevent bacterial spoilage and retain the fruit's fine texture, Cerelose brand dextrose sugar is used to protect the flavor . . . without over-sweetness.

Cerelose brand dextrose sugar is more than just a sweetener here. It accentuates the presence of butterfat to produce the kind of richness Americans like in ice cream. Also, in sherbets and ices, Cerelose allows the manufacturer to increase body without increasing sweetness.

Our technical staff welcomes the opportunity to show you why you should use Cerelose brand dextrose sugar in your formula. Call us today.

CORN PRODUCTS REFINING COMPANY
17 Battery Place, New York 4, N. Y.

Safety in Plants

—Continued from page 110

can expect to see a significant reduction in accidents."

Safety-Production Teamwork

Best results in safety work stem from accident-prevention efforts built into normal operating procedures and executive decisions, according to F. T. McGowan, safety director, The Borden Co., N. Y. C.

This organization-type approach brought about four major benefits:

1. Company-wise accident frequency rate dropped 35%—from the all-time high to the all-time low. Each year since 1949, consistent improvements were scored in vehicle and employee-injury accident frequency rates.
2. Accident costs, too, showed substantial improvement. At the end of 1954, Borden's insurance department declared a 20% dividend, which was returned to every company district and division in the form of adjusted accruals (lower self-insurance premiums).
3. Two operations, each employing about 100 men, completed 1,000,000 man-hours without a lost-time accident.
4. Greatest satisfaction is realization that executives and operating personnel appreciate the valuable contribution a good safety program makes to production and sales performances and in controlling production and delivery costs.

Mr. McGowan pointed out that cost of an average accident takes profit away from 87,000 qt. of milk—not because accidents costs are unusually high but because profit margin is low in a quart of milk.

He continued: "No wonder safety performance and accident costs are on the agenda at every meeting of top executives, at board-of-officers meetings at district and division levels, at production and sales managers meetings, at local level, and at plant engineers' meetings.

"Building an organization for safety is comparable to developing an organization for producing a product or providing a service. To establish this relationship, the planning involves the same facilities, processes, employees, supervisors, and management direction.

"To plan a safety program," he went on, "management is required to do the same as in production—to induce and stimulate people to work together in accordance with a production or sales program. Just as in production, management must evaluate its safety needs, determine the extent of

DAY JUMBO MIXERS... meet every requirement imposed by heavy loads. For instance, the standard-duty DAY Jumbo Mixer is equipped with two roller bearings mounted on heavy fabricated supports. Heavy-duty units have an extra outboard bearing to eliminate cantilever action or drift. Air- and grease-seal stuffing boxes and 3-piece, dust-type covers are standard equipment. Agitators have a laminated outer ribbon, continuous welded, ground smooth, with outer ribbon having a relieved trailing edge to eliminate rubbing action. Tanks can be equipped with heating or cooling jackets for 40, 60 or 80 psi. Available in 600- to 3850-gallon capacities. For complete information write for Bulletin 800.

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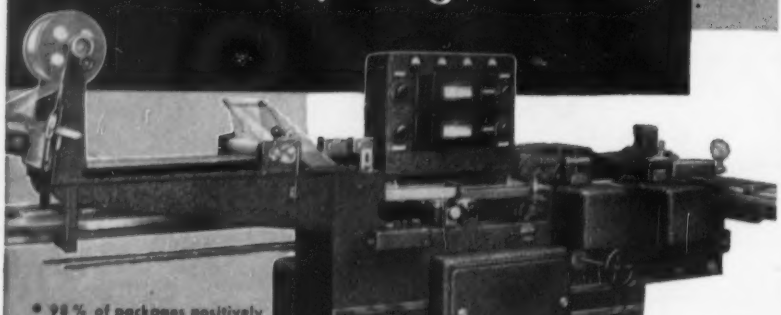

- 98% of packages positively sealed — guaranteed!
- Eliminates shrinkage and color loss
- Tremendous savings in materials and labor
- 40 to 70 units per minute — double head
- Reduces spoilage — extends shelf life
- Increases sales appeal — wins new customers.

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Get The Facts Today — Learn about this revolutionary, new VACUUM PACK Wrapper — how and why its "leak-proof" packaging production can be *guaranteed*. Write for full particulars.

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It is hereby guaranteed that out of every 100 units Vacuum-packed on a CAMPBELL Vacuum Pack Meat and Food Wrapper in regular production service — 98% or more will be positively sealed against leakage at sealing areas of heat-sealing wrapping material used for the package.

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organization needed, establish safety objectives, and assign responsibility for appreciation and development of safety practices to members of management team."

Challenge of the New

"New machinery and products create a different set of conditions likely to cause accidents. And before they occur, possible causes must first be ferreted out," reported A. J. Deile, training division, General Foods Corp., White Plains, N. Y.

He cautioned against top management's usurping department supervisor's responsibility for safety. Supervisors, he said, should be trained to investigate accidents, uncover accident causes, prevent them, and be held accountable for them.

On Materials Handling

One out of every three accidents is attributed to conveyors, reported E. J. Steinkellner, safety director, Jos. Schlitz Brewing Co., Milwaukee.

He told how miles of roller conveyors at the brewery have now been replaced with safer line belt.

Screw conveyors, he warned, should be covered so as to prevent workers from being mangled by the helical screw. Bucket elevators should be provided with observation windows. Pulley ends of belt conveyors should be enclosed with metal sheets. And drive mechanisms of all conveyors should be guarded, with protruding grease cups for simpler maintenance.

Adequate switches should be installed so operators need not run too far in case of jam-ups. Cross-over walks should be provided for close-to-the-floor conveyors.

Mainly, back injuries and pinched fingers result from improper car loading and unloading, according to Roy E. Campbell, safety engineer, Campbell Soup Co., Chicago. To curb them, workers are taught proper handling techniques. Also, lights are installed in cars, and protecting canopies are provided.

Accidents are also attributed to insecurely bound metal strapping material, difficult-to-open car doors, and improper flagging and switching of cars (with men in them).

"The supervisor is the logical one to train workers in safety," declared John D. Gallagher, assistant superintendent of engineering department, Hartford Accident & Indemnity Co., Chicago.

He said one reason group training often fails is that the trainer cannot be specific about each man's job hazard. Generalities don't arouse sufficient interest on the part of a

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give you the greater protection and longer service of *all-plastic* piping systems!

The new Walworth plastic Valves and Fittings are made of rigid polyvinyl chloride which is non-aging, non-corrosive and non-toxic and has extremely low flammability and high resistance to chemical attack. Walworth PVC products are molded by General American Transportation Corporation. Each product bears the stamp of Walworth's long established engineering skill and reliability — your assurance of safe, trouble-free valves and pipe fittings.

Walworth PVC Y-Globe Valves are designed to regulate the flow of alkalis, acids, inorganic salt solutions and other troublesome fluids commonly found in food, chemical and allied industries. They will give exceptional service at temperatures as high as 150°F and are designed for use with schedule 80 pipe. Other features of these valves include: (1) Three chevron, Teflon packing rings give you a leak-proof seal without binding the stem. (2) No useless threads to accumulate troublesome dirt because no stem threads enter the interior of the body. (3) Snap-on spherical plug with ball-to-cone seating arrangement to assure a tight line-contact seal between disc and seat regardless of any minor inaccuracies in alignment. (4) Full 45° angle of stem with center line of pipe to reduce pressure drop and turbulence. (5) Generously designed flow passage at the valve seat for a more even flow. (6) Back seat design allows repacking when wide open under pressure. (7) Polyethylene bonnet gasket to assure a perfect body-to-bonnet seal.

Walworth PVC Diaphragm Valves come equipped with neoprene discs. Other diaphragms especially suited to your application can be furnished. "R-2" rubber diaphragms are commonly used in systems handling dilute acids and alkalis. "J-1" Teflon diaphragms are recommended for maximum chemical resistance.

Valve design features: (1) No stuffing box or packing to replace. (2) A resilient diaphragm connected to the compressor by a stud assures a leakproof closure on the body weir or valve seat even when slurries or semi-solids are in the line. Diaphragm easily replaced without removing the valve from the line. (3) Streamlined flow area in valve body makes valve self cleaning and allows fluids to flow equally well in either direction. (4) Separation of valve body from the sealed metal bonnet protects fluids from contamination. Fluids contact only the valve body and diaphragm. (5) Completely enclosed metal bonnet protects stem from breakage and distortion.

Walworth PVC Fittings assure uniform thermal expansion of pipe and fitting threads when used on plastic pipe. They eliminate the danger of jammed threads, loose joints and the chance of galvanic corrosion. These screwed pipe fittings are: (1) Designed for use on schedule 80 of plastic pipe. (2) Walls are of uniform thickness accurately molded. Proportions are skillfully worked out in all sizes and types of fittings. (3) Fittings are chamfered to protect the thread and afford easy entrance of the pipe. Long bands provide reinforcement at the points of severest strain.

This booklet contains all the details about Walworth PVC products that you'll want to know. It describes mechanical and thermal properties, working pressures, sizes and dimensions, application and assembly data. For your free copy write to us. Please use company letterhead.

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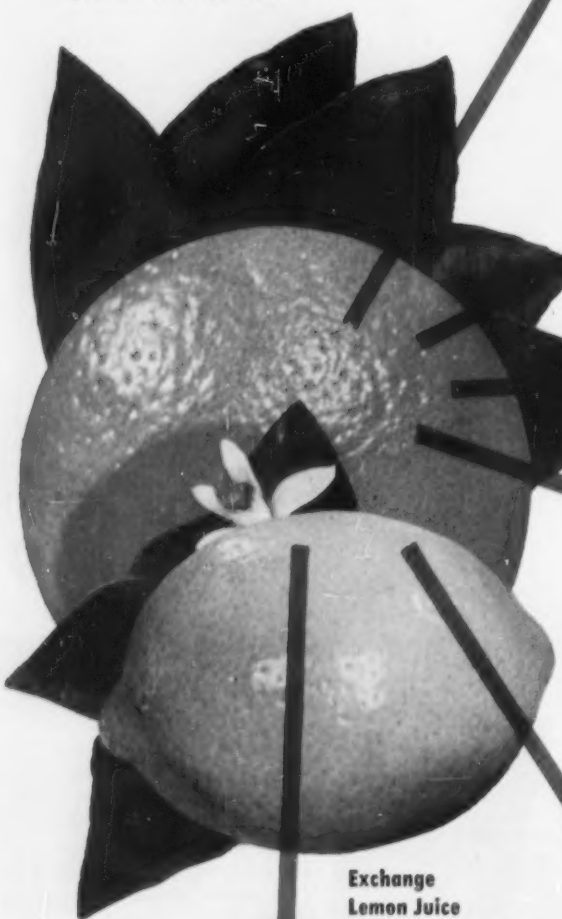
Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

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worker to make him safety-minded.

Specific safety educational work, he concluded, is largely a responsibility for supervisors. Because of their authority and close daily contact with employees, they can translate safety generalities into everyday safe-practice precedures that apply to tasks, machines, tools, and processes.

End (*Resume reading on page 113*)

Radiation Symposium

—*Continued from page 104*

compounds in complex organic media.

Added to these advantages is the facile manner in which certain physical properties can be determined and recovery efficiencies ascertained in analytical investigations.

These aspects can be illustrated by experiences in the food industry. Direct analysis for vitamin B_{12} can be performed radiometrically by isotope dilution. Observations concerning the stability of vitamin B_{12} in multivitamin mixtures has been greatly facilitated by the availability of vitamin B_{12}-Co^{60}.

The reverse isotope dilution method has been employed to ascertain the stability of vitamin B_{12} in cereals. And the fate of potassium iodate during the baking of bread was elucidated by applying the carrier technique to bread baked with $KI^{129}O_3$.

Measurements of solubility, air concentration, and extent of utilization of labeled compounds by animals, performed by radiometric procedures, are a great simplification over conventional methods of obtaining such information.

End (*Resume reading on page 107*)

Flour to Product in 17 Min.

—*Continued from page 83*

spices, egg, and milk solids can be accurately metered in at the desired percentage. Cut-and-folded flights assure suitable mixing as breading mix is delivered to bagging hopper.

To prevent ingredient separation due to "coning", this hopper has a network of baffles. An automatic bagger (Diamond) is located below hopper. It permits use of tuck-in type snout bags, thereby eliminating sewing. Bagger can be set for various automatic cut-offs by a simple weight adjustment on a scale bar that actuates a microswitch to stop motor and momentarily reverse feed screw, thus preventing overfeeds.

A platform scale is used for check-weighing and for scaling product into drums. A special unit packages material in 5-lb. bags. Bags of 100-lb. size are palletized and loaded into trucks or freight cars.

Product Control

Protein and ash contents are regulated by types of flour used. Taste and color are basically controlled by the flour used, amount of moisture added to make the dough, and the degree of baking (automatically controlled with pyrometers). For desired particle size there are the many grinding adjustments to give a close mesh tolerance. Fines are limited to prevent clumping and to provide coarse particles that permit ready absorption when products are used as thickeners.

However, absorption and moisture levels can be held at high or low values, according to final product use. Amount of water added, plus rate and degree of baking, as well as glutenizing obtained by varying extrusion pressures and spray-blending, all control these features.

Empirical data have been obtained over long-term operation. Now amount of moisture can be predicted by reading motor ammeters on the two size-reduction units used for non-stop production of the dough.

Even so, moisture of final products is periodically checked with a modern rapid-moisture balance in company's new analytical laboratory. Latter facility is also equipped to carry out tests on samples submitted for duplication.

End (*Resume reading on page 84*)

Milk Sessions

—*Continued from page 96*

stroyed by heat, and so can be differentiated from others. It is quite specific and may interfere with one culture but not another. Therefore, several cultures of pure lactic streptococci of known sensitivity should be used in the test.

The disk assay is a convenient and satisfactory method for detection of antibiotics. And specific tests have been developed to detect and identify bactericides.

CULTURED PRODUCTS

Methods of improving quality of cultured buttermilk or sour cream were described by Dr. E. S. Guthrie, Cornell University.

After listing steps for producing quality products, he stressed the need for further research in manufacturing methods to meet the more demanding distribution and consumer require-

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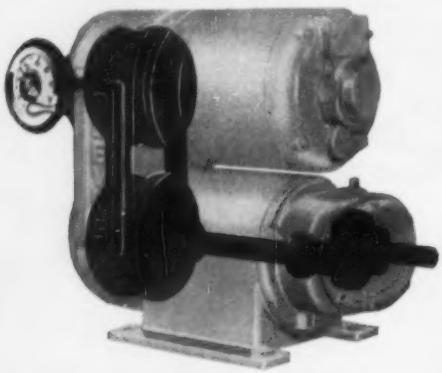

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ments. He also predicted that buttermilk may be expected to hold up one to two weeks, instead of a few days as is the practice now. To permit this, it will be necessary to prevent foaming when filling into bottles, and also formation of whey on the surface.

In the case of cultured cream, effects of high-temperature short-time pasteurization, different stabilizers, and vat ripening on the product's body are problems to be studied.

A specially designed plummet that has enabled processors to improve the uniformity of cultured cream body was demonstrated.

NAME OFFICERS

Elected to head the MIF for the coming year were: President, C. Raymond Brock, New Haven, Conn.; Vice-President, Hubert Garrecht, Memphis, Tenn.; Secretary to board of directors, Gilbert H. Hood, Jr., Boston, Mass.; and Treasurer, E. J. Mather, Washington, D. C.

End (Resume reading on page 95)

Quick-Release Coating

—Continued from page 99

slides out. To handle this heavy load, screw conveyor's 3-hp. motor had to be replaced with a 5-hp. unit.

It is specially noted that the releasing agent can also be used on cooling slabs, mixing kettles, conveyors, cutting knives, etc.

Moreover it can also be applied to bread and cake pans. For it does not smoke at baking temperatures nor from carbon or resin-gum films.

Furthermore, meat plants are now spraying this coating on inside surfaces of ham and meat loaf molds, sausage tubs, and all sizes of luncheon meat containers. Even inner surfaces of consumer meat cans and tins have been treated.

In this application, coating material is loaded into a 5-gal. air-pressure tank, operating at about 45 psi. Hose attached to pressure tank is connected to a trigger-operated spray gun. It is noted that 1 lb. of atomized release agent covers the same areas as 4 lb. of the formerly used coating material.

Results of coating the inside surfaces of 36-in. luncheon meat and 6-lb. baked loaf molds are termed good. Loaves quickly slide out of the molds, without showing marred appearance or grease-coating discoloration.

Molds, too, are easier to clean, since the loaves no longer flake (flakes of meat adhering to molds) and there is no baked residues to remove from the molds.

End (Resume reading on page 100)

Want to get un-stuck on production difficulties?

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Fairfield, Conn.

COATINGS OF

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‡Du Pont's trade-mark for its acrylic fiber.

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

There are times when a product should *lose* its grip—improved "release," they call it. Take the case of electric irons used to heat-seal plastic films. Technicians of the Du Pont Fabrics Division suggested a *coated fabric* that proved ideal for covering the heating elements. It had the necessary heat resistance plus excellent "release"—no sticking whatsoever.

If you need a special gasket, seal, diaphragm or protective cloth material in your design—why not try a Du Pont coated fabric or sheet stock? You can obtain the exact combination of properties you need with the proper fabric and coating. Heat resistance with good "release," abrasion resistance with superior flexibility, oil resistance with high strength—these and many more combinations are possible.

We'll be glad to discuss possible application of coated fabrics in your design or on your equipment. Just clip and mail coupon for further information.

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Fabrics Division F-512, Fairfield, Conn.

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Baker Delivers the Goods

Faced with the problem of servicing customers beyond the range of their delivery trucks, Munzenmaier Baking Co. came up with a unique answer: it delivers some of its baked products by mail.

The pumpernickel, rye, and other specialty breads are shipped as far as 3,000 miles to retailers and individual customers, retaining their freshness even after six or eight days in transit. If refrigerated when received, the products may be kept for some time. Many Munzenmaier customers freeze the bread, enabling them to order in bulk.

Demand for the Long Island bakery's products is spurred by the Old World recipes in use at the plant. To match the flavor of German pumpernickel, for example, Munzenmaier bread is baked at extra-high temperatures. Sanitation is an all-important feature.

The 10% of the plant's output that is shipped by mail is packed in standard cardboard boxes. No special insulation is used, though Mycoban (DuPont) is added to the flour before processing. The mold and rope inhibitor is reported to have tripled the life of the baked goods.

Circle 164A on Reader Service Card

Pre-Baked Pizza Shells

Packaged in a bright red, white, and blue printed cellophane bag, pre-baked pizza shells are being marketed in Philadelphia by the American Baking Co.

Each package contains two large shells. Instructions for preparing pies are printed on the front. A transparent window provides full product visibility.

Products Get New Dress

Taller cans with brighter labels have been adopted by Buitoni Foods Corp. for their pizza, meat, marinara, and mushroom sauces. Containing 10½ oz. instead of the former 8 oz., the cans have greater eye appeal, more illustration, and increased emphasis on the Italian origin of the recipes.

Each sauce is identified by color—red for meat sauce, for example. An added feature of the label is an inset of Signora Giulia Buitoni.

Promotion of Royal gelatin desserts has been boosted by an attractive new package illustrated with the prepared product in four colors.

An added advantage of the desserts is Vitamin C fortification, prominently noted on the new label.

Eggs Without Shells Developed at Cornell

Shell-less eggs are to be marketed under a new process developed by Professor L. B. Darrah, Cornell University. Machines drop the eggs into cup-like compartments after breaking the shells. Carbon dioxide is added to the plastic package to maintain quality and the compartments are sealed with film. The sealed 12-compartment package is then marketed.

The housewife may poach or boil and serve the eggs in the individual compartments. For frying or scrambling, they have to be removed.

Professor Darrah plans to start marketing the shell-less eggs in Ithaca stores soon.

Margarine in Pats

Ready-sliced margarine is now being test marketed by Armour & Co. in eight southern and midwestern states. With use of a new machine, Cloverbloom "99" churned margarine is sliced into 16 square pats. Each quarter pound is then foil wrapped in a standard carton.

Just right for individual servings, each packed portion is equivalent to one-half tablespoon measure, making them helpful in preparing recipes.

The pats are separated by opening the foil package and then twisting it slightly.

Stylish Beer Cans

Directed at the woman shopper is a new line of "high style" packages marketed by Anheuser-Busch, Inc. In line with a reported trend toward beer purchases by housewives, the new cans and cartons began to reach retailers last month.

Slim 10-oz. cans, the same height as the 12-oz. but with a smaller circumference, are packed in a white, red, and grey carton. Gloved hands and slim lettering on the label help establish the "style" motif. The same design of gloves and lettering in brown and black is used on the master cartons.

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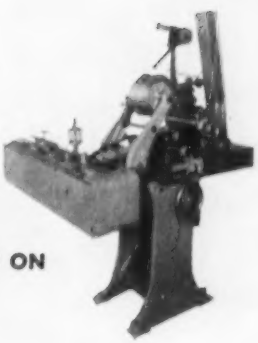

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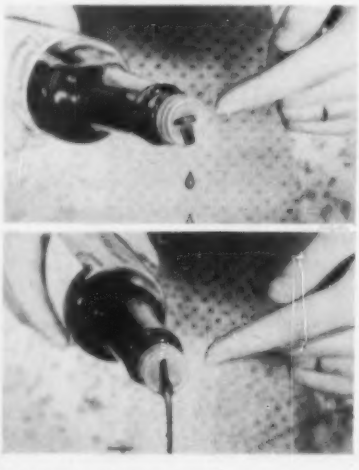
New Liquid Sweetener

A dietetic liquid sweetener called Sweetnin is being marketed under Tasti-Diet label by Flotill Products, Inc. The result of five years of research, it is reported to have no calories but yet to be usable in baking and cooking recipes.

The product is packaged in a 4-oz. bottle. A special applicator cap permits dispensing small amounts of the liquid. Non-nutritive calcium saccharin is the sweetening agent used in the product.

Each 4-oz. bottle is said to be equal to 4 lb. of ordinary dry sugar.



Dripless Sauce Cap

The R. T. French Co., Rochester, has introduced an exclusive slotted cap for their Worcestershire sauce bottles. The cap prevents dripping and allows dispensing either by drop or in a stream.

Made of polyethylene, the cap contains a slot which allows the product to be shaken from the bottle drop by drop when held in a horizontal position or poured in a steady stream when held in a vertical position.

The new slotted fitment, plastic closure, and bottle are supplied by Owen-Illinois Co.

Circle 166A on Reader Service Card

Dry Milk Density Upped

A jar of nonfat dry milk that formerly made three quarts of skim milk now makes four quarts as a result of a new improved process developed by Pet Milk Co.

The same size jar that held 9¾ oz. of powder now holds 13 oz. Product retains all its advantages, plus more volume per storage space. Price of the jar has been increased slightly though the consumer still realizes a saving.

Frozen Kosher Dishes

A tasty and exotic line of frozen kosher foods will announce the entry of Horowitz-Margareten, Long Island City, into the frozen food field.

Stuffed derma, chopped liver, stuffed cabbage, chicken fricassee with meat balls, and meat kreplach comprise the new line. Biggest selling point of foods is "homemade" taste. All are suggested as snack items or main courses.

Super-Dietetic Yogart

Already significant as a dietetic food, yogart is now being marketed with 50% of the butter fat removed by Dannon Yogart Co., New York City.

A full 8-oz. container of the processor's yogart now holds approximately 120 calories. Orange-flavored

yogart has about 170 calories and the vanilla about 180 calories. The product is reported unaffected by the partial removal of the butter fat. Health and easy-to-digest qualities are retained.

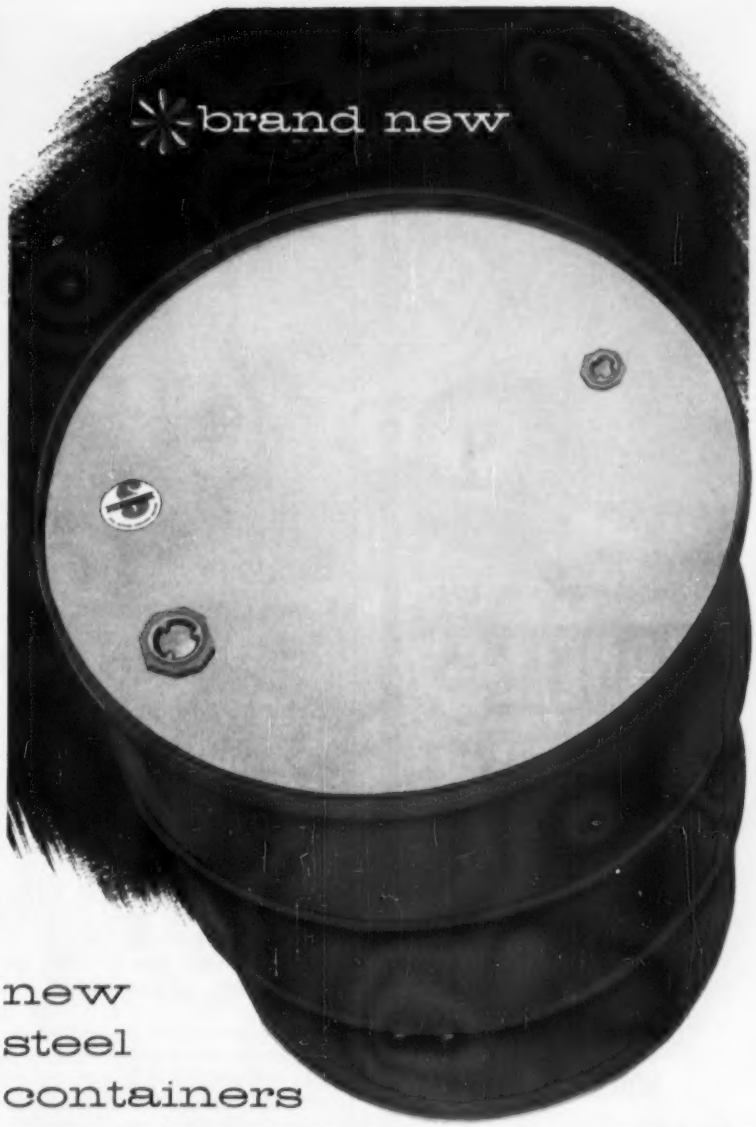
Salted Pumpkin Seeds

Roasted and salted pumpkin and squash seeds are sold by Fisher Nut Co., St. Paul, packed in heavily-waxed laminated paper envelopes. Packets are printed in brown and yellow and contain ⅞ oz. of seeds.

Mustard Dispenser Pack

Holland Mills, Inc., Chicago, is marketing its prepared salad mustard in an unbreakable dispenser. Marketed under Koops' label, the 4-oz. container is topped with a cone-shaped plastic top that allows neat and controlled application of the mustard. A small red cap seals the opening.

Semi-transparent, the container is printed in red. Re-use value of the container is emphasized on the imprinted label.



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Schmaltzedige Spread

Carmel Kosher Food Products, Inc., Chicago, has attached a free bonus jar to their regular one-pound size of schmaltzedige spread, a blend of vegetable shortening and chicken fat with onion and vegetable color.

A bright amber band holds the smaller jar on the lid of the large one, serving as an effective and attractive seal. A dotted line indicates the dividing line between the jars. The consumer may then cut them apart, sample the smaller jar, and return the larger one for a full refund if she is not satisfied.

The product does not require refrigeration. It is made under strict rabbinical supervision.

Chicken in a Bag

Frozen fried chicken is packaged in flexible film bags by American Poultry & Food Co., Gainesville, Ga. A polyethylene and cellophane combination called Durafilm, made by Dobeckmun Co., Cleveland, is used.

Each half-chicken is packed in each red and yellow lithoprinted bag. It is then sealed on a Wrap-Ade machine. Label is prominently marked "Only 6½ minutes to prepare."

Circle 168A on Reader Service Card

Cruets for Vinegar

Ricco Food Products Co., San Francisco, is packaging its new line of wine vinegars in attractive 5½ oz. cruets. Sealed with a cork for shipping, the bottle has a glass stopper attached. When opened and glass top inserted, the package makes an attractive table server with a practical re-use value.

New Product Shorts

Smoked Tuna is processed by Fine Foods Inc., Seattle, under the Standby label. Six oz. of flaked meat are packed in each can.

Frozen Herring cutlets are packed in polyethylene jars by Booth Fisheries Corp., Chicago, in sour cream or wine sauce.

Pure MSG, packaged in 12-oz. jars for institutional use, is newest Durkee Famous Foods product.

Longfiber Kraft and Polyethylene are ingredients of a new double-strength bag made by Crown Zellerbach Corp. Seam sealing technique allows contents to touch only the polyethylene.

Half-pint Carrier used by Whiting Milk Co., Charlestown, Mass., holds six small milk containers.

Grape Tray which is inserted into windowed sleeve or overwrapped is manufactured by Standard Folding Trays Corp., New York City. Package holds 2-lb. of grapes.

Trailers Travel by Train

—Continued from page 107

cars, six trailers, and five delivery trucks are used. And in the continuous operation there are always two trailers being loaded at Fort Worth, two on their way to Odessa, and two returning.

While more pieces of equipment are now used, the total cost is actually smaller. Delivery equipment for the road-runs cost $91,000, as opposed to $72,200 for the rail-haul carriers.

Road-haul equipment costs broke down to $7,000 each for three heavy-duty road tractors, $10,000 each for three 32-ft. trailers, and $8,000 each for five standard delivery trucks.

Today, initial equipment outlay is $7,000 for each of the six 18-ft. trailers, $3,100 apiece for the two small Odessa tractors, and $8,000 for each of the three delivery trucks required.

Each tractor-trailer unit had been making two round trips weekly under the discontinued road haul, whereas with the piggyback procedure two trailers arrive each day.

Volume also increased with the new system. The former large trailers carried 28,000 lb. of meat. In contrast, the two smaller trailers boast a total payload of 36,000 lb. The six weekly deliveries formerly made with the road haul ran to 168,000 lb., as compared with the new higher weekly delivery of 180,000 lb.

For actual movement, costs are about the same per pound.

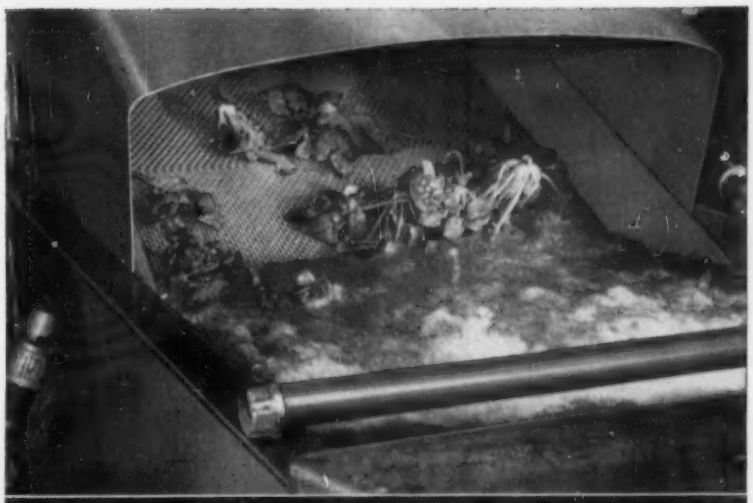
The railroad used by Armour is the Texas & Pacific, whose main line parallels the highway route between Fort Worth and Odessa. Tariff for moving the flatcar with two loaded trailers weighing a total of 30,000 lb. is $120 from Fort Worth to Odessa, and $60 for the return of the empties. A charge of $.60 per cwt. is made for cargo in excess of 30,000 lb.

Accordingly, rail expenses for the standard load of 36,000 lb. would be $180 for the first 30,000 lb., plus $36.00 for the 6,000 lb. in excess. Adding the 3% tax, this gives a total of $222.48 for the round trip.

So pleased is Armour with the results of the new system in Texas that H. O. Mathews, transportation and distribution division manager, is weighing the idea of employing piggyback operations to other break-bulk points 175-325 miles of the plant, provided main-line rail service is available.

Another piggyback operation is being considered for the packer's deliveries from Omaha to Kearney, Neb., a distance of 180 miles.

End (Resume reading on page 109)



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Surface Ripening of Cheese

Selection of film yeasts and micrococci known to produce desirable flavors should help guarantee prompt production of good flavor in brick cheese.

Pure cultures of film yeasts and micrococci were isolated from surface smears of brick cheese and from cheese brines. The micrococci that predominated were colorless variants of *M. varians*. Next in order were *M. caseolyticus* and *M. freudenreichii*. Attempts were made to ascertain source and cause of the typical odor of a brick cheese smear.

Growth of micrococci with film yeasts indicated that the latter stimulate growth of cocci on surface of cheese by reducing acidity and furnishing accessory food substances.

Butyric and acetic acids were identified as products of the growth of cultures of micrococci on milk agar, but the fraction with an odor characteristic of brick cheese smears was one containing higher fatty acids.

Addition of *B. linens* plus two film yeasts neither improved the flavor nor produced a Limburger flavor. The typical flavor was found most frequently in cheeses to which *M. caseolyticus* had been added, but one inoculated with *M. freudenreichii* had a very pronounced brick cheese flavor. —*Journal of Dairy Science*, 981-90, Sept. 1955.

New Canned Food Sterilizer

Vapors derived from trichloroethylene and perchloroethylene or mixtures of both are used as heating medium in a patented process for sterilizing canned foods.

These compounds have boiling points of 189 and 250 F., respectively, and their mixture in varying percentages will yield vapors having temperatures throughout the range indicated. The compounds are stable under repeated evaporation, thus insuring a constant vapor temperature in the sterilizing apparatus.

Equipment for the process comprises a heating chamber and a cooling chamber through which cans of food are conveyed continuously by means of a chain conveyor. Heating chamber is 40-60 ft. long in which the cans are moved back and forth as many as 10 times to give time for adequate sterilization.

The chlorinated hydrocarbons are vaporized in shallow sumps located beneath the heating chamber and heated by steam coils. Uniform temperature is maintained by circulation of the hot vapors at a velocity that will insure no temperature drop in the entire circuit.

Leaving the heating chamber, the conveyor carries the cans to the cooling chamber where they cooled with water sprays in a draft of air. Volume of water and flow of air are controlled to reduce the temperature of cans and contents to 110-105 deg. F. From here they are conveyed to an unloading station.—U. S. Patent 2,716,609, Aug. 30, 1955.

Spray-Drying System

Efficient heat transfer and rapidity of drying are claimed for a spray-drying system in which air is preheated to a temperature of 430 F.

Substance to be dried is sprayed, and the heated air is distributed, into the top of a drying chamber where the two streams are efficiently mixed. Air distributor is wholly outside the drying chamber so that there are no ducts or other objects within the chamber on which the dried powder can settle.

Powder falls to the bottom of the chamber where it is immediately removed by a pneumatic discharge device and blown to a series of cyclones. These feed a pipe through which cold air is drawn, resulting in a powder, the final temperature of which is not more than 5 deg. higher than that of the air.

Powder is collected in another cyclone from which it is withdrawn for packaging. System may be used for drying milk, tannin extract, coffee extract, egg yolk and white of egg.—*Food*, 372-73, Oct. 1955.

Low Lactose Milk Powder

To meet the demand for a milk product having a relatively low lactose content, a process has been devised and patented for removal of lactose from skim milk by concentration, crystallization, and centrifuging.

Milk is concentrated to a viscous fluid containing 35-55% solids, cooled, and blended with ethyl alcohol in quantities ranging from 10-45% by weight of concentrate. When mixture is held at about 32 F. for 5-8 hr., lactose crystallizes rapidly. Crystallization continues at diminishing rate for the next 15-25 hr.

At end of this period temperature is raised to accelerate conversion of beta to alpha lactose, then mixture is cooled for final crystallization. Lactose is recovered by centrifuging or

Penetrating-Type Bactericidal Paint Controls Mold Growth and Odors

Painted surfaces in environments such as meat packing plants are subject to more than the normal destruction by flaking, both by reason of the vigorous cleaning methods, and by growth of molds on and under the surfaces.

The penetrant-sealer type of surface coating leaves no residual film on a surface to be removed by wear, and if it can be made antimicrobial such a coating would be advantageous. Using copper-8-quinolinolate, numerous penetrant-coating formulations were tested by impregnating a 9-cm. filter paper with the sealer, allowing it to dry, then placing it on a dish of mineral salts-agar, and spraying with a suspension of four molds (spores) known to attack surface coatings.

From the degree of mold growth around and on the impregnated disk the penetrant formulation could be rated for effectiveness, following which, patch tests were made on wood and masonry surfaces. Finally refrigerator trucks and railroad cars were treated with emulsified Cunilate 2419 and Cunilate 2174 in deodorized mineral spirits, followed by application of refrigerator car varnish. Other trucks and railroad cars were treated with Cunilate varnishes or with raw linseed oil.

Daily inspection of the trucks and cars for 6 months showed complete absence of mold growth and bacterial odors, and varnish containing the copper-8-quinolinolate has been adopted for treatment of refrigerator trucks.

In process rooms the antimicrobial penetrants have kept treated panels in moist humid areas free of molds for 2 yr.—*Applied Microbiology*, 277-88, Sept. 1955.

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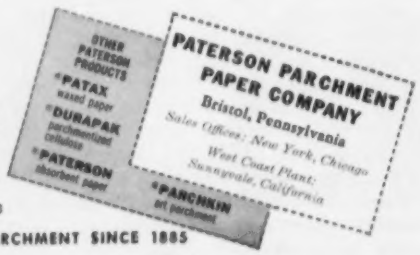

HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

otherwise and remaining liquor is treated by distillation for recovery of the solvent. Remaining material is spray dried, forming a high quality, partly delactosed skim milk powder. —U. S. Patent 2,710,808, June 14, 1955.

Effectiveness of CIP

Recent studies have determined the effect of velocity, time, temperature, and types of cleaners on the method of cleaning dairy lines in place. The procedure has many advantages over hand cleaning, and is just as satisfactory as the more cumbersome method of dismantling, scrubbing, sanitizing and reassembling.

In summary, the bacterial quality of milk products passed through CIP lines was equal to that of products passed through hand-cleaned (HC) lines. On hot milk surfaces, higher CIP temperatures gave better physical cleaning than lower temperatures; but higher CIP temperatures did not give better bacteriological cleaning than lower temperatures for surfaces of cold milk lines. Internal surfaces of lines were cleaned more easily than bevels or gaskets by both CIP and HC methods.

Of polyphosphate cleaners, the one containing the highest concentration of polyphosphate in solution gave the best physical cleanliness. A chelated caustic cleaner gave similar results. Bacteriological results from CIP lines (150 F. or higher for 20 min.) were consistently lower than those of HC lines and showed no coliform contamination.

Results with HC lines were erratic and showed spotty coliform contamination. Microorganisms did not penetrate paper or fiber gaskets when used for periods up to three weeks in CIP lines. On the whole, CIP procedures are as effective as, or better then, dismantling and brush-cleaning. — *Food Technology*, 150-156, July 1955.

Effect of Sodium Methylate On Lard and Tallow

Catalytic treatment of lard and tallow with sodium methylate materially alters the glyceride composition of the former but is almost without effect on beef tallow.

This is the major conclusion from experimental work in which high-quality lard and freshly rendered beef tallow (vacuum dried) were treated with sodium methylate for 1 hr. at an initial temperature of 55C., gradually increased to 70 deg. before filtering and drying.

It was further observed that the treatment does not affect the fatty acid composition of the lard, nor its usual chemical constants and melting points. It does change the physical characteristics as shown by consistency numbers, dilatometric and micropenetration measurements, and cooling curves. With beef tallow, only the cooling curves show any change.

In cake volume tests with lard and treated lard to which 8% lard flakes had been added, latter yielded a volume of 225 cc. per 100g. of cake, compared with 190 cc. per 100g. for the former.—*Journal of the American Oil Chemists' Society*, 522-25, Oct. 1955.

Preparing Fish Fillets For Deep-Fat Frying

A method of handling frozen fish prior to cooking, particularly fish fillets that have been frozen in blocks, is revealed in recent patent specifications.

A block is sawed transversely into slices comprising cross-sectional portions of the fillets. Then each slice is breaded to absorb the juices that start to flow from the cut edges. Slices are then thawed, after which they are again breaded and fried in the usual manner.

Crux of the process is to bread immediately the surfaces of the fish before they thaw, coating them with enough material to prevent loss of flavor and moisture. Breaded slices may be held indefinitely prior to final thawing, but once thawed they are again breaded before frying in deep fat.—U. S. Patent 2,716,608, Aug. 30 1955.

Liquid-Solid Extraction By Ultrasonics

Ultra-sound (400 kc.) applied to a suspension of 16-20 mesh peanut meal in *n*-hexane increased extraction efficiency (ratio of oil in solvent to control without insonation) to 2.76 times that of the control.

Maximum effect was obtained with a sound intensity of 63.3 volt-amperes input per sq. cm. of extraction tube area, using an electromechanical transducer for production of the high-frequency sound. The increased extraction is not due to thermal effects which were calculated for the experiments, but may be duplicated by high-speed mechanical stirring of the peanut-hexane suspension.

Three mechanisms may be active in producing the increased yield: (a) Increasing disruption of particles and oil

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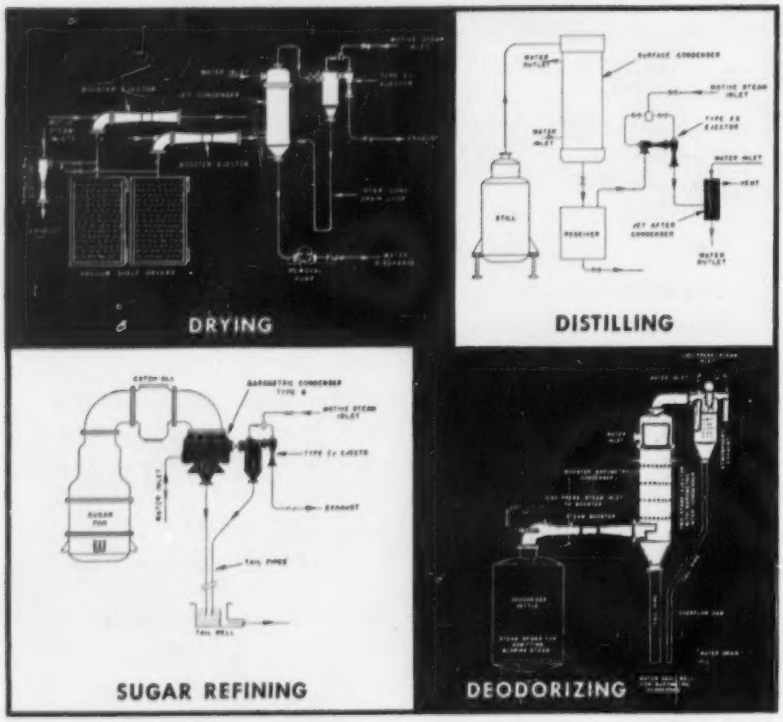

C. H. Wheeler has always led in the development of the steam jet ejector and its application to the vacuum process field. Today, our cumulative engineering experience gives you the benefits of low initial cost and reliable operation. You get flexibility in design and installation and efficiency, over a wide field of application. C. H. Wheeler Tubejets provide large volume removal of gases or vapors at very high vacuum, with low operating and maintenance costs. There are no moving parts. Operation is simply the opening and closing of valves. Long life is assured. Write for Catalog No. 1462. Representatives in principal cities.

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- VACUUM REFRIGERATION
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Food Engineering Reports
LATEST TECHNICAL NEWS
In Keeping Up With Field . . . page 191

cells with increased surface for attack by solvents; (b) Selective agitation of particles at their surfaces of contact with the solvent, and (c) Thermal effects.—*Industrial & Engineering Chemistry*, 1167-169, 1955.

Bleaching Bread Doughs

In the batter process of bread making (Rank & Hay Process), half the flour is mixed with all the water for about 7 min. in a specially designed machine.

Batter thus produced is then transferred to a conventional mixer and made into a dough with the rest of the flour in the usual way. During the high-speed mixing there is considerable bleaching and the dough is improved at the same time.

Unbleached flour can be made into acceptable bread by this process and it is in commercial use in Scotland. During development it was found that increased bleaching was obtained by the addition of 0.1% unprocessed soy flour.

Soy flour's lipoxidase content, suggested a mechanism for the bleaching effect, for it is known that as carotenoid pigments are also bleached in a coupled reaction when fat oxidation is catalyzed by lipoxidase. Experiments in which pigment destruction was measured during the high-speed mixing confirmed the hypothesis that lipoxidase activity produces the bleaching effect. Antioxidants reduce the effect, mixing the dough in oxygen increases it.

Molecular oxygen is necessary for lipoxidase bleaching and use of oxygen for bleaching and ripening of straight doughs mixed conventionally is a possibility, as is the bleaching of flour by exposure to atmospheres of high oxygen tension.—*Journal of the Science of Food & Agriculture*, 501-11, Sept. 1955.

Formation of Lactobacilli On Fermented Vegetables

Dill pickle products, both cucumber and tomato, are sometimes affected by occurrence of white pustules on their surfaces. These also occur in fermented olives where it has been shown that they are massive subepidermal growths of *Loctobacillus plantarium*.

In pickles and tomatoes, small white blemishes appeared about 3 weeks

after the start of fermentation. Within 6 weeks the pustules were quite pronounced with diameter 0.5-3.0 mm., and were filled with a buttery soft white material composed of gram-positive rod-shaped bacteria.

Of 44 cultures obtained from such pustules on tomato pickles, 37 had characteristics of *L. plantarum* while the others resembled *L. leichmannii*. On dill pickles the blemishes due to these bacteria are not unsightly, and sweet pickles made from pustulated salt stock are acceptable.—*Applied Microbiology*, 314-16, Sept. 1955.

Chocolate Tests

Two physical properties of chocolate that are useful for defining quality and controlling it are: Penetrometer test value (related to its viscosity), and resistance of flexure stresses, both steadily and suddenly applied.

Penetration tests are (20-28 C.) most useful when applied over an increasing temperature. A standard penetrometer equipped with a photoelectric recording device is used to obtain a curve. Milk chocolate resists penetration until 23-26 C. is reached, then it gives way suddenly. Chocolates containing vegetable fats are penetrated at 18-20 deg.

To measure resistance to bending, a bar of chocolate of accurately standard dimensions is supported at its ends while a steadily increasing weight is applied to the center. Both pressure at rupture and flexure at the point where the weight is applied are measured.

For resistance to bending by shock a pendulum-type tester is used. Pendulum swings through the bar and arc of travel after the break is measured. Milk chocolate is less resistant to bending than dark coatings, but is more resistant to rupture by pendulum tests.—*International Chocolate Review*, 1334-41, 1955.

Color in Sugar Solutions

Darkening of sugar cane juice during alkaline defecation with lime occurs in the presence of: (1) Glucose and fructose produced by the always present invertase; (2) amino acids, principally asparagine, and (3) non-nitrogenous organic acids, chief of which is aconitic acid.

In a system analogous to cane juice, made up of glucose, fructose, tripotassium aconitate, asparagine and water, a similar darkening occurred.

At pH 8 color production in cane crusher-juice is probably due, first to reaction of glucose and fructose with asparagine, followed by reaction of

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Automatic Packaging of Powdered Milk Formula at Nestlé Co.

Producing Their Own Gas Through a GAS ATMOSPHERES' GENERATOR

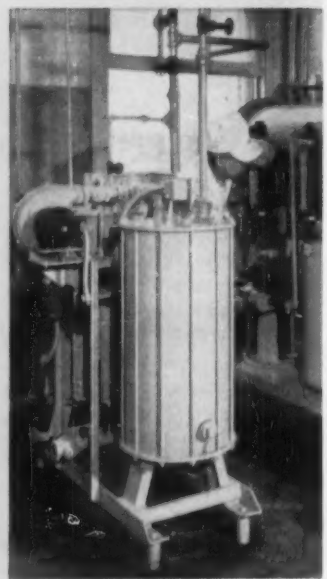
Costs Dropped From $9.60 to 15¢ per Day

Modern methods employed by the Marysville, Ohio, plant of The Nestlé Company, Inc., in packaging powdered milk formula for infant feeding call for the removal of all air, replacing it with an inert gas that prevents oxygen from coming into contact with the food. This is a practice that is rapidly gaining in popularity with the nation's leading food packers.

Nestlé's daily requirement of gas is about 1400 cubic feet. If purchased in cylinder form, this would cost approximately $9.60, plus the labor required for handling. By manufacturing their own gas, this amount costs a mere 15 cents. Figuring 320 working days in the year, the savings amounts to more than $3,000 annually—or enough to purchase generator equipment.

Nestlé has tried other generators, but prefers the Gas Atmospheres' because it gives them maximum production of highest purity gas at low operating costs.

Let Gas Atmospheres' engineers show you how you can produce your own gas at tremendous savings. Simply set down your requirements and they will estimate your equipment needs and give you a cost breakdown at no obligation.



Gas Atmospheres' Generator Used by Nestlé to Manufactura Inert Gas.

gas Atmospheres, inc

Equipment for producing industrial gases

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the same sugars with aconitate. The first reaction is a Maillard type, while the second is probably due to the alkaline interaction of reducing sugars. The tripotassium aconitate affords only the acid-base environment and does not enter into the reaction directly.

There was a tendency for all of the mixtures studied to drop in pH as the heating period (212F.) continued, from an initial 7.7-7.9 to around 5.6-6.6.—*Industrial & Engineering Chemistry*, 1416-17, 1955.

Improving Foam Stability Of Malt Beverages

Addition of a small quantity of cellulose ether to malt beverages has been found to stabilize the foam and increase its life from six to ten times that of an unmodified foam.

The ether suggested is a hydroxypropyl methyl cellulose having 0.05-0.2 hydroxypropyl and 1.5-2.0 methoxyl groups per C_6 unit, whose 2% solution in water at 68 F. has a viscosity of at least 1000 centipoises. It is added at the rate of from 50-500 ppm. of beverage by weight, or 0.005-0.05%.

This particular cellulose ether is said to be superior to similar compounds, including such closely related products as methyl cellulose having the same methoxyl content, and a hydroxypropyl methyl cellulose having the same methoxyl content but over 0.2 hydroxypropyl units per C_6 unit. Addition does not affect color, clarity, or palatability of the beverage.—U. S. Patent 2,712,500, July 5, 1955.

Vacuum Dehydrators

Vacuum contact-plate dehydration of potatoes, cabbage, carrots, tomatoes, pork, and beef in chops or steaks, fish in fillets, yields dried products of better color and more tender texture than air drying.

High-fat minced meat mixtures (up to 60% fat) have been dried without difficulty, and pork dries readily without development of rancidity.

Drying equipment (patented by A/S Maskinfabrik, Copenhagen) consists of a rectangular chamber fitted with 24 hot water heating plates each accommodating an aluminum tray and lid 8 ft. long and 4 ft. wide.

Plates are movable through a lever system operated from outside the unit so that they may be maintained in contact with the materials in the aluminum trays, throughout the drying period. This is extremely important when drying under vacuum since heat transfer is entirely by conduction,

convection being impossible, and transfer by radiation being very limited at the temperatures used.

Pressure of plates on drying material may be zero at the start and 1¾ psi. at the end of the dehydration period. Steam and water-jet evacuators are used to produce the vacuum. The water ejectors alone can bring the pressure in the drier down to about 27 mm. of Hg absolute, and addition of steam jets reduces it further to about 2 mm. Hg for final drying stages.

Temperatures under the vacuum system are lower than when air is present, consequently browning reactions are held to a minimum, and storage life, especially at the low moistures obtained (close to the theoretical limits), is expected to be greater.

Because of pressure applied during dehydration, bulk density of products is greater in the vacuum-dried foods, about twice as great for potatoes, for example. On the other hand, the vacuum-dried potatoes as well as other products, reconstitute more quickly and yield foods of more natural texture and color.—*Journal of the Science of Food & Agriculture*, 427-40, Aug. 1955.

New Rat Exterminator Retains Virulence

By sealing bacteria of the Salmonella group in an ampule under vacuum, a process has been developed for manufacture of a rat exterminating compound that can be stored and maintained in virulent condition for years.

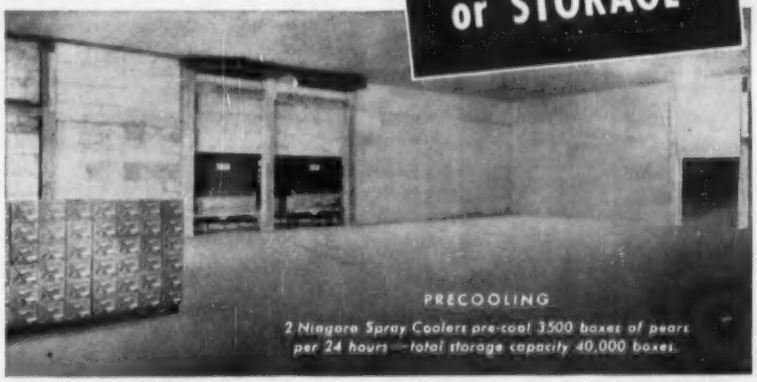
This is in contrast to the previous method of manufacture in which the exterminator remained active for only one or two months and showed weakened virulence after one or two weeks.

According to the patented invention, unfrozen Salmonella bacteria are placed in ampules in a dessicator containing a drying agent such as phosphorus pentoxide. Air is exhausted from the ampules to a final pressure of about ¼ mm. Hg, then it is sealed. Reduction in pressure is effected step by step over a period of several days, starting at about 100 mm. Hg and being reduced each day to a value of about one-half that of the preceding day.

Rat exterminator can be prepared as desired by breaking the ampule and dissolving its contents in a nutritive substratum of pepton bouillon. It has been found that the bacteria disperse through the substratum faster if they have been dried on a piece of filter paper placed in the ampule.—U. S. Patent 2,717,226, Sept. 6, 1955.

NIAGARA "No-Frost"

PRECOOLING or FREEZING or STORAGE



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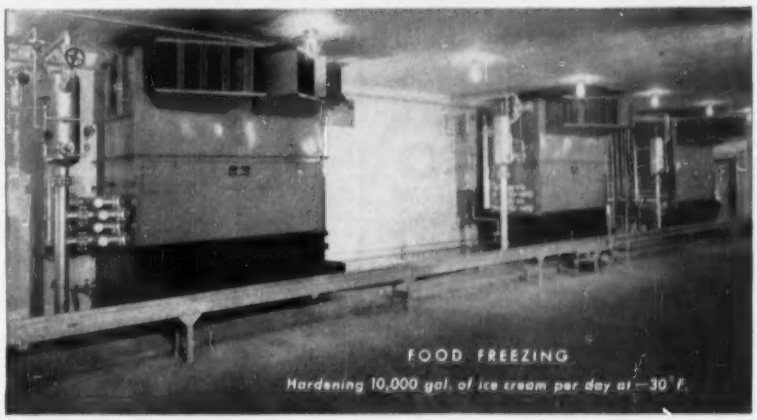

FOOD FREEZING
Hardening 10,000 gal. of ice cream per day at —30° F.

FROZEN FOOD STORAGE
Room 80 ft. x 135 ft.—Temperature —5° F.

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Write for Bulletin 105

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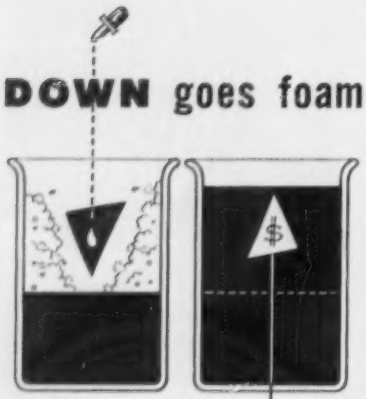

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Line Performance Upped

—*Continued from page 84*

provided good protection, the inner, Pliofilm, did not always adhere uniformly and closely to every slab, resulting in some mold growth from oxygen contact. This, in turn, caused some product returns.

To improve film protection a new heating tunnel has been installed, following the wrapping machine. It takes advantage of the product's natural "oiling-off" reaction when heat is applied. After careful calculations it was found that a temperature of about 280 deg. F. applied for about 60 sec. would cause sufficient oiling-off to make the inner wrap adhere closely to the cheese. While not absolutely vapor-proof, the new method has significantly reduced mold incidence and product returns.

The tunnel is 12 ft. long and equipped with steam-radiator heater. Heated air is recirculated through the duct work by a squirrel-cage fan. Cheese is conveyed on a stainless mesh belt through this unit.

The case press, designed and fabricated by Tillamook, is operated by a 6 in. pneumatic cylinder. Its restricted passage-way provides sufficient compression for sealing the cases. At its exit, a Rollacoder codes each case.

Also, at this exit, is a hand-sculptured wood chute which, by its shape, turns cases right-side up, then drops them onto a roller-conveyor, from which they are palletized. This chute also serves to reverse the direction of the case flow (see photo) thus saving space formerly required in straight line flow.

End (*Resume reading on page 85*)

Ice Cream Talks

—*Continued from page 97*

after picking, where possible. And under most conditions it should be packed with sugar (4+1) and frozen to reduce volatilization of flavor components.

Suggested formula is:

Pectin	0.6-1.2%
Sucrose	28%
Corn syrup	25%
Water	8%
Fresh fruit	37-38%

Where 4+1 pack fruit is used, its quanity should be increased to about 48% and sucrose reduced to 18%.

Method of preparation comprises blending pectin with 8 lb. sugar and adding mixture to water in heating kettle. Mixture is heated to 180 F. with constant agitation, then corn syrup is added gradually, followed by slightly defrosted fruit, remainder of sugar, and color if desired. Material is strained and frozen at −10 F.

Product should be injected into ice cream at rate of 20% by weight at temperature slightly below that of the semi-frozen ice cream.

STRAWBERRY FACTORS

With high quality berries, such factors as freezing rate, fruit-to-sugar ratio, "sugar curing," and stabilization seem to offer little or no advantage in the flavor quality of strawberry ice cream, according to D. G. Guadagni, WURB, Albany, Calif.

Cited were experiments on: Temperature tolerances, freezing rates, sugar curing, amount of sugar, and effect of stabilizers.

For the temperature tolerance tests, samples of commercial sugared berries stored at 0 and −30 F. were compared with controls stored at −20 F. And though organoleptic appraisals indicated flavor changes at temperatures above 0 F., trained panels could not detect significant flavor differences between ice creams made from the control and those produced from berries stored at +20 F. for 6-8 weeks.

Effect of freezing rates was determined on 4+1 sugared berries by comparing samples frozen in a −30 F. blast (approximately 2 hr.) with others brought to 0 F. in 5 days. Again, organoleptic comparisons showed a preference for the quick-frozen berries. But in ice cream, flavor differences were not detectable.

Other berries were sugar cured by holding at 35 F. for 16-36 hr. after addition of sugar, whereupon a portion was frozen rapidly and the remainder slow-frozen. Here, no consistent difference was noted between "cured" and "uncured" berries.

To determine effect of sugar, berries were packed in 2+1, 3+1, and 4+1 fruit-to-sugar ratio, and without sugar. Sugar in the ice cream mixes was adjusted so final content of each ice cream was the same. And to avoid iciness, all fruit was thawed and pureed before use.

None of the sugared fruits produced an ice cream of significantly different flavor from that of unsugared berries.

Also, whole and sliced strawberries were packed with stabilizers and compared with unstabilized berries containing the same amount of sugar.

Some of the stabilizers caused a uniform distribution of berries throughout the pack but produced no significant differences in color, firmness, or drained weights. Flavor imparted to ice creams were similar.

End (*Resume reading on page 99*)

Questions & Answers

THIS MONTH'S PROBLEM

Bulk-Handling of Mayonnaise

Question—At present, we are canning edible oils, which are shipped in tank cars from the refinery. We are wondering if we can do the same thing with mayonnaise—receive tank car shipments, pump it from cars into our own tanks, and then fill it into jars? And can you furnish us with the pros and cons of this method of bulk-handling mayonnaise?

OCTOBER PROBLEM

Getting Maintenance Help

Question—We operate a food-processing establishment in a small town, located in a predominantly farming region some distance from any large industrial center. Much fine equipment is being offered to our industry, but we have hesitated to adopt much of it because of the difficulty we have in staffing our maintenance department with qualified mechanics, electricians, etc. Possibly, this is a problem common to other food plants. Could you give us some suggestions for strengthening our maintenance staff, so that we can keep pace with mechanization of the industry?

Answer—It is certainly true that many food-processing plants are at a disadvantage when it comes to hiring skilled mechanical workers, because of their distance from large industrial centers. You do not mention that your work is entirely seasonal, so you may have some advantage in this respect over plants operating only a few weeks per year. We assume that your line is such that non-perishables may supplement purely seasonal business, so that you do have reasonably stable employment to offer.

The following suggestions may be helpful in at least giving you a start toward a solution of your problem:

First, why not recognize the difficulty, if not impracticality, of finding skilled workers in urban areas when needed, and inducing them to move? In other words, start with the basic assumption that you will have to work with local personnel.

It will be seen at once that your problem is a two-fold one involving finding persons with mechanical aptitudes and training those persons for your specific maintenance jobs. Candidates will have to be drawn from your present work force and the surrounding community.

Maintenance work is skilled and will, therefore, carry a higher wage rate than many routine factory operations. Additional earnings are possible through over-time inherent in many maintenance jobs.

Therefore, if you advertise to your own employees and the community that you are looking for candidates with the necessary aptitudes for maintenance training, you should have little difficulty in securing a list of applicants. You will want to screen this list for such factors as physical health and faculties, any experience (as a radio "ham", etc. in the armed forces), and personal character.

We then suggest that your applicants be given a suitable set of aptitude tests to select those who have ability both to learn and to acquire mechanical skills. For this step, you may need the advice of a professional psychologist—either a consultant, or someone in your local school system or state university.

We assume that by these steps you will have located a small group willing to become maintenance men and capable of being taught.

Next step involves training. Ideally, training should be a combination of practical on-the-job work, plus a study of basic fundamentals. We know of no better way to accomplish the first than to put trainees to work as helpers of experienced men.

However, for this to be effective, all concerned must be fully familiar with your program and committed to its support. This will involve more education of the experienced men, and the whole labor force in general. They must be made to see that the continued prosperity, maybe even the life, of your company depends upon its keeping up with competition and making

How Would You Do It?

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise.) We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

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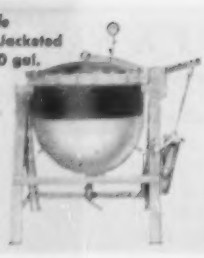

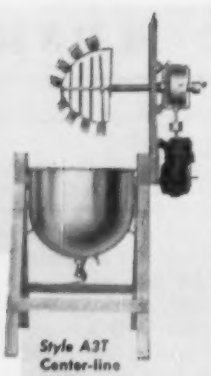
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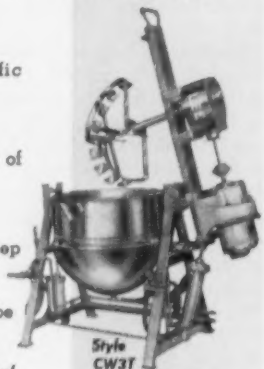
Style
CW3T
Center-Line Scraper
Agitator Kettle
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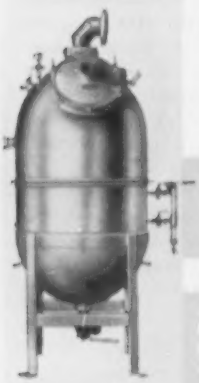
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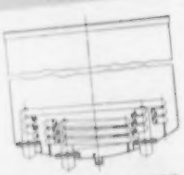
Pulp Tank 500 to 2,000 gal.

Quick Cooling Pan
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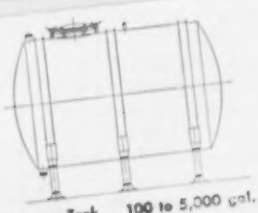

Storage Tank 100 to 5,000 gal.

use of the very best methods and equipment available.

The experienced man must know that he is not to be replaced, but that he will have better opportunities as the maintenance department grows. He should feel honored at being chosen for key work in this expansion program.

Possibly the most difficult phase of all to work out in detail will be the "study of basic fundamentals." It is important enough to warrant careful preparation, and again you may find that professional advice is necessary.

You may turn to your local high school, university extension service, or the U. S. Dept. of Labor apprenticeship officials for help in mapping out courses in mathematics, electricity, mechanics, mechanical drawing, metallurgy, safety, and any others you deem advisable.

These courses might be given at certain hours of the day (on company time). Or arrangements might be made to finance the trainees' studies at night classes at high school or by correspondence. Your own plant engineer or food technologist may have enough ability to teach some of these classes.

For additional pointers, you may wish to send some of your key personnel to the annual plant-maintenance conferences, where information on matters of this sort may be exchanged not only between companies, but between industries as well.

Main thing to remember is that you must take the initiative all the way—in attracting candidates and then selecting and training them.

You are to be congratulated in recognizing the importance of this matter, and we believe that the cost and effort of developing your program will be amply repaid in your increasing strength as automation in our industry progresses.

Making Butterscotch Topping

Question—Do you have a good formula and directions for manufacturing a butterscotch sauce to be used as an ice cream sundae topping?

Answer—Measure into a steam-jacketed kettle: Water, 7 lb.; sodium bicarbonate, 1 oz.; sodium citrate, 1 oz.; and butter, 3 lb.

Heat batch until butter is melted. Now add 8 lb. of brown sugar and 25 lb. of cane sugar. Dilute 2 lb. of sweetened condensed skim milk in 2 lb. of water, introduce into kettle, and heat to 240 deg. F.

Slowly add 6 lb. of sweetened condensed skim milk diluted with 5 lb. of water, and bring batch to a boil.

Now pour this hot batch into 40 lb. of corn syrup that has previously been heated to 170 F.

At this point, add color (usually orange), to suit; butter flavor, to suit; and salt, 5 oz. Homogenize at a pressure of 200 psi., and fill at 190 F.

Two Vacuum Systems

Question—We have been considering replacing a battery of open kettles with a vacuum pan. Vacuum systems involve use of either an eductor-condenser or mechanical vacuum pump. Before choosing, we would appreciate comment by a disinterested party on the relative merits of these two systems.

Answer—We assume that suppliers quoting on this equipment are fully familiar with expected performance—pounds of vapor to be evaporated and condensed, inches of vacuum required, and availability of necessary utilities. Further assumed is that, with this information at their disposal, suppliers have offered equipment of the proper size and capacity to do the job. In other words, either type of equipment is capable of performing satisfactorily.

It is generally true that the eductor-condenser will require much less electric energy to operate than an equivalent mechanical vacuum pump. This may not make too much difference in operating costs per year, or per unit of product, unless you happen for some reason to be paying very high electric rates. On the other hand, if you are limited in electrical capacity—say in your transformers or feeder to the particular department in question—this difference might weigh heavily in your final choice.

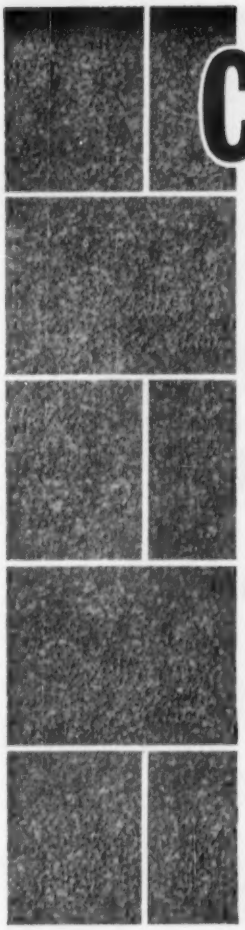
On the other hand, the mechanical pump will probably consume only a fraction as much water and, since this would merely circulate through the cooling jacket to remove heat, it could be used elsewhere if desired. In more and more localities, water conservation is becoming important, and you should give this point careful consideration.

While on the subject of water, the eductor-condenser vacuum capability is limited by the available makeup water temperature. Therefore, if you use surface water, you may find it im-

---

Q.—Do you have a baking powder biscuit-mix formula?

A.—Blend at low speed in vertical, beater-type mixer: Sifted, all-purpose flour, 48 lb.; non-fat milk solids, 9 lb.; baking powder, 2¼ lb.; and salt, ¾ lb. Extrude into batch (with mixing) 18 lb. of shredded shortening.



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possible to maintain as low a vacuum in the summer as in the winter.

One point seemingly in favor of the eductor-condenser is that moving parts and maintenance requirements are at just about a minimum. A mechanical pump is subject to wear and maintenance, as a piston mechanism is bound to be. If the installation is to be made in a limited space, the small space required for the eductor-condenser is also in its favor.

Canadian Inquiry

Question—Do you have instructions for tin- or glass-jar packing chicken and noodles?

Answer—You can easily work out a product to suit the taste of your consumers by varying this formula: Chicken broth, 50 lb.; dry egg noodles, 25 lb.; and cooked chicken meat (small pieces), 25 lb.

To 50 lb. of broth collected from the pre-cooked chicken, add 2.50 oz. of white pepper (ground).

Cook noodles and drain with cold water. Now mix: Cooked noodles, 25 lb.; cooked chicken meat, 25 lb.; salt, 10 oz.; diced onions, 2½ oz.; and black pepper (ground), ⅛ oz.

Fill into cans or tins, add broth, and retort-process 25 min. at 250 F. (for No. 1 cans).

Trouble With Wastes

Question—In lagooning our cannery-waste effluents, we have encountered odor problems that have forced us to consider some better waste-disposal method. We understand that some work has been done on some method of spraying such wastes. Could you give us an idea of what would be involved in this type of disposal?

Answer—We assume that you refer to disposal by spray irrigation. This method is attractive under the correct conditions, by far the most important of which is that you have access to a considerable amount of land within economical pumping distance. Just how much land is required will depend upon the nature of the soil, "cover crop", and the waste itself.

Other requirements are a surge tank, screening equipment, pump, main pipe line, lateral pipe lines, and revolving sprinkler heads.

It may be somewhat unexpected to learn that absorption of liquid wastes is better upon land with a cover crop such as grass or alfalfa than upon bare earth. Such cover crops also are better than food crops such as vegetables, which apparently can be damaged by receiving too much water. Some promising results have been obtained by

spraying in wooded areas. However, there is much to be learned about leaching of minerals and the fertilizing value of various waste constituents.

In practice, screened wastes collected in the surge pit are pumped through the main line to the spray area. Here, they are distributed through laterals to the spray nozzles, which may handle around 15 gpm. each. It has been usually found necessary to frequently move the lateral pipe to avoid excess application. And, for this reason, aluminum or plastic pipes of light weight are indicated.

So far, it has not appeared that an economic return on investment can be obtained from the improvement in cover crop through spraying. But with increasing shortages of water plaguing the nation, you should carefully study this waste-disposal method.

Parking Problem

Question—The village in which our cannery is located is considering outlawing parking by employees on streets adjacent the plant. In order to be prepared, we would appreciate information on providing parking lot facilities for our employees. We estimate about 65 cars per shift.

Answer—A 100x175-ft. lot would be adequate for 65 cars. This is based upon 60-degree parking, with a 9-ft. width allowed per car. One row can be parked along each long edge, and a double row down the middle.

If your plant operates on shifts, you might wish to provide double this space, so that incoming employees will have parking space before the first shift cars leave. Traffic flow would be facilitated by prescribing one spot for entrance and another for exit, and maintaining one way traffic through the lot.

At the very least, your space will have to be graded and marked off into individual car spaces in some manner, as by laying spaced railroad ties.

If you wish to do a more permanent

Q.—Is there anything that you can suggest doing to check toughening of starch-jelly confections made with regular, thin-boiling starch?

A.—We understand that use of a high-conversion corn syrup will significantly prolong the tenderness of gum goods. This syrup, produced by the acid-plus enzyme-conversion process, has a dextrose equivalent of 63 compared to 42 for regular confectioners' corn syrup. And 60 lb. of this high-conversion syrup is used along with 40 lb. of granulated sugar.

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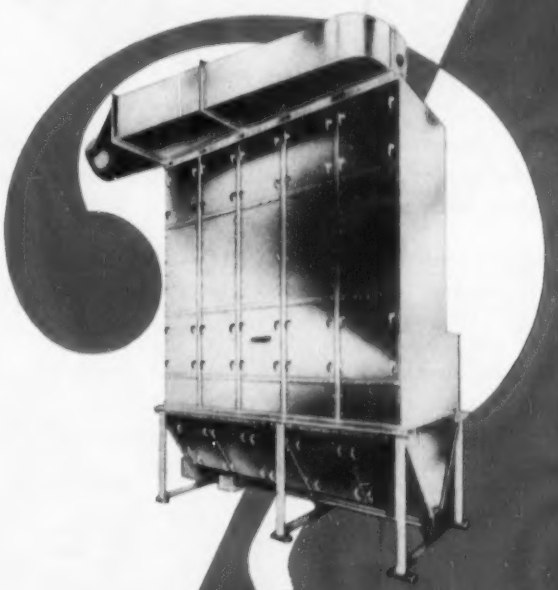
Our engineering staff will specify the Simon Suction Filter Dust Collector to meet your requirements. . . . . ship you the parts and installation instructions and you can "DO-IT-YOURSELF"! All parts are jig-drilled and tapped to facilitate assembly . . . or dismantling should future requirements dictate its relocation.



OR. . .

Our engineering staff will design a "turn-key" dust collecting system incorporating a Simon Suction Filter Dust Collector, tailored to your specific requirements . . . contract and supervise its complete installation . . . relieving you of all details until it's time to pull the "ON" switch.

Regardless of which method solves your dust collecting problem . . . the all aluminum SIMON SUCTION FILTER DUST COLLECTOR is the answer. It has been redesigned and streamlined to keep in step with modern food processing . . . contains greatest filtering area per square foot of floor space . . . operates with high air to cloth ratios . . . uniform air flow . . . low power requirements . . . IT IS YOUR BEST BUY IN DUST COLLECTING EQUIPMENT!

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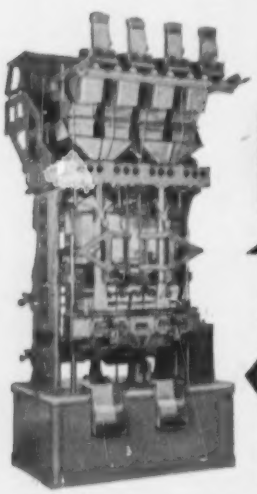

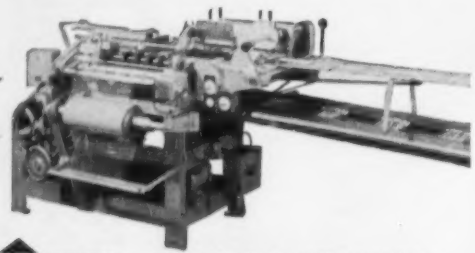

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job, an excellent parking lot can be made of crushed rock with bituminous coating, simulating the "black top" familiar as highway construction (though it need not be so thick if there is to be no truck traffic). With such surface, the car stalls can, of course, be marked with traffic paint, using a 4-in. strip of white or yellow.

Aside from the purely physical matter of what space and surface to provide, it would be well to include in your preliminary thinking such matters as protection and liability. This may lead to requirements for fencing, lighting, and a watchman, as well as revision of your insurance, if your company is to be adequately covered in case of questions arising from theft or accident in the space you have provided.

Coconut Spread Formula

Question—Can you furnish us with directions for making toasted coconut spread, using coconut and sugar?

Answer—Here's a simplified procedure for sugar-toasting coconut.

Place 70-lb of coconut in a revolving pan or kettle equipped with a gas burner. Now dissolve ½ lb. of salt in 15 lb. of hot water. Slowly pour

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Q.—How do you pop wild rice?

A.—Simply drop a small amount of unwashed wild rice into a fine screen colander, deep-fat fry (375 F.) a second or two until rice pops, spread on absorbent paper, pepper and salt to taste.

---

hot salt solution over coconut in revolving pan. Continue rolling pan 5 min. to permit thorough distribution of salt solution throughout coconut.

Gradually add 30 lb. of powdered sugar (6x or 8x) to rolling coconut. Thoroughly distribute sugar by allowing to roll additional 5 min.

Important: Scrape walls of pan to remove coconut stuck to them.

Turn on gas heat all the way and toast coconut to desired color, being careful to break up lumps as they are formed and keep walls of pan clean to prevent burning.

When desired color is obtained, turn off gas and quickly remove coconut from pan. Spread out in a thin layer on trays to cool as quickly as possible—otherwise a darker colored toasted coconut will be obtained.

Several flavor variations can be produced by substituting 15% of the sugar with either corn, maple, or brown sugars; malted milk; or skim milk powder.—*Formula by Franklin Baker Div. of General Foods Corp.*

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Foxboro Magnetic Flow Meter . . . transmits flow measurement to recorders or controllers.

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Heart of this system is the Foxboro Magnetic Flow Meter. It has proved highly successful in measurement of widely varied food products including beer, tomato products, apple juice, and grape juice. And it's equally applicable to many others, such as egg yolks, wine—even molasses! It measures *magnetically*, with no flow interference, no pockets, crevices, or projections to collect residue or contamination. And its high accuracy is sustained, despite variations in conductivity, density, and viscosity.

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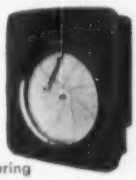

Foxboro Dynalog Recording Controller. Responds instantly to changes in volume flow, initiates fast, accurate valve action to hold pre-set rate. Troublefree, stepless measuring circuit has no slidewire — requires no standardizing or batteries, practically no maintenance. Control action can be air-operated or electric-operated.

Foxboro 2-way Saniflo Control Valve. A streamlined valve for liquids, suspensions, viscous or pulpy materials. Equally effective for throttling (proportional) or open-and-shut control. One-piece stem and plunger — no threads or crevices to harbor bacteria. Quick-disconnect clamp for easy cleaning. Can be replaced in control system by other type valve or a pump to meet process requirements.

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Useful New Books & Government Publications

Guide for Executives

BUSINESS MANAGEMENT HANDBOOK. *Edited by J. K. Lasser. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City 36. 1954. 809 pages. 6¼ x 9¼ in., cloth. Price:* $8.50.

Directed at helping the executive develop the type of authoritative thinking, planning, and talking that mark successful management, this book utilizes the ideas of 20 specialists in the field.

It traces and discusses in detail the operations of every business department, from budgeting to public relations. The thoughts expressed are up-to-date and practical.

Among subjects presented are financing and starting a business, locating, marketing, insurance, controlling paper work, and doing business abroad.

Controllers and Recorders

INSTRUMENTS FOR MEASUREMENT AND CONTROL *by Werner G. Holzbock, Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1955. 371 pages. 6¼ x 9 in., cloth. Price:* $10.

Measurement and control of temperature, moisture, pressure flow, and uniformity are of paramount importance in the food industry. In clear, precise language, this book offers a detailed explanation of the design, operation, and construction of such instruments.

Among topics covered are assorted process variables and the instruments marketed for their measurement, analytical process instrumentation, controller action devices, and such miscellany as motors, valves, pumps, and transformers. A chapter on trends presents a thorough discussion of miniaturization, digital computers, and centralized systems.

Using Organic Chemistry

INDUSTRIAL AND MANUFACTURING CHEMISTRY, ORGANIC *by Geoffrey Martin, Published by Philosophical Library, Inc., 15 E. 40th St., New York City 16. 1955. 752 pages. 6¼ x 10 in., cloth. Price:* $17.50

Giving equal treatment to both American and British practices, this book is a treatise on the applications of organic chemistry in manufacturing. As much as possible, the information offered is the latest available factual data.

The aim of the editor has been to present a thorough picture of both small and large industry, as well as new and little known industries. Special attention has been afforded the

FE REPRINTS AVAILABLE

Difficult-to-find practical information on food plant operations and materials is available in the "roundup" reports and articles listed below. Single-copy reprint prices are given. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

8. Newer Ingredients $1.25

Twenty-page report on the newer ingredients which aid in producing better food products (May, 1952). It includes detailed articles on these subjects: (1) Guide to Optional "Chemical" Additives. (2) Antioxidants Provide New Flavor Controls. (3) Industrial Enzymes Now Speed Natural Processes. (4) Food Emulsifiers Bring New Highs in Uniformity. (5) Seaweed Extractives Find Versatile Uses in Foods.

9. Vacuum Cooling $0.75

Eight-page special report covering the use of efficient vacuum cooling in a wide variety of food processing operations to save costly process time, reduce labor, increase output, and avoid spoilage losses (October, 1952). Performance data for specific types of applications are presented in this engineering study.

10. Packaging Materials $1.00

Sixteen-page report on how to get better production-line performance with packaging materials and containers (March, 1952). It includes these comprehensive articles: (1) Developing Your Package for High Output. (2) How Properties of Materials Affect Packaging Speeds. (3) Nipping Production Slowdowns by Pre-Checking Supplies. (4) Tips on Ordering Materials for Top Performance. (5) Proper Storage of Your Stock Averts Line Headaches.

11. Sanitation $0.50

Six-page report on "How To Assure Top Sanitation in Your Processing Equipment" (Jan., 1952). This report was a preprint of one section of a practical book on food plant sanitation prepared by Association of Food Industry Sanitarians.

12. Materials Handling $1.00

Twelve-page report entitled "How Modern Materials Handling Gives New Spurt in Processing" (March, 1951). Case histories of important savings through more efficient handling are presented. And the different types of handling equipment are described and illustrated.

13. Mixing $0.50

Four-page roundup of progress in plant mixing methods and equipment, plus a forecast of what is ahead (Oct., 1953). Performance data are included as yardsticks of what can be achieved.

14. Aseptic Canning $0.75

Eight pages, including foldout picture flowsheet, describe, evaluate, and illustrate in detail the continuous, short-time, high-temperature aseptic canning process that won the 1951 Food Engineering Award. (June, 1951).

profitable utilization of by-products.

Of special interest to food people are sections dealing with animal and vegetable oils, fats, fatty oils, the dairy industry, margarine, essential oils, sugar, starch, fermentation, and gelatin.

Dairyman's Reference

THE BUTTER MAKER'S MANUAL, *Vol. I and II by F. H. McDowall. Distributed by Steckhert-Hafner, Inc., 31 E. 10th St., New York City 3. 1955. 1589 pages. 6¼x9¾ in. Cloth. Price:* $35.

A must for the dairyman, this two-volume work covers all aspects of butter processing. Written by one of New Zealand's leading chemists, it is directed at providing a complete guide to the science.

Illustrated with photographs and sketches, the work covers such subjects as production of milk and cream, neutralizing, pasteurizing, cooling and aging cream, packaging, structural properties, etc., butter batch losses, manufacturing costs, and refrigeration. Each chapter is followed by a comprehensive and complete bibliography.

On Managing Personnel

Following booklets are published by the California Personnel Management Assn., 2180 Milva St., Berkeley 4, Calif. All are 8½ x 11 in., paper bound stenographic briefs of panel discussions.

HOW TO LEAD MEN (Report No. 219)

MAKING MANAGERS OUT OF SUPERVISORS (Report No. 214)

THE SUPERVISORS JOB TODAY (Report No. 207)

ARE UNIONS COMMITTING SUICIDE? (Report No. 220)

WHAT'S WRONG WITH PERSONNEL PROGRAMS (Report No. 223)

Booklets & Reports

GUIDES TO EFFECTIVE PRODUCTION MANAGEMENT *(No. 218 in Manufacturing Series). Published by American Management Assn., New York City 36. 48 pages, paper. Price:* $1.75 *($1 to members).* Five papers on communication, coordination, and controls in the production department.

REGULATIONS AFFECTING THE MOVEMENT AND MERCHANDISING OF MILK *(Marketing Research Report No. 98) Published by USDA, Washington 25, D. C. Paper. No charge.* Causes and effects of state or federal regulations.

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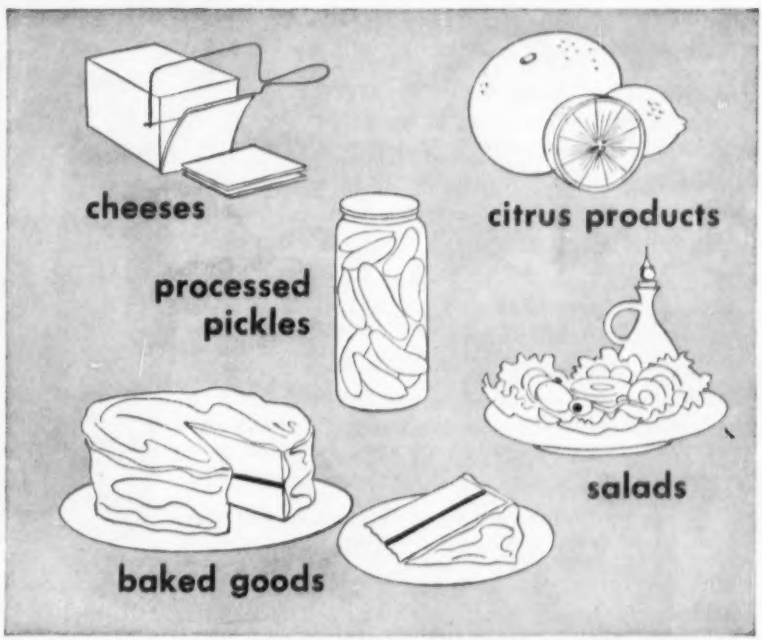

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Arbitrating Grievances

—Continued from page 65

selecting an executive who must be accustomed to making sound decisions can be applied to the selection of an arbitrator.

Comment by Mr. J.—Furthermore, knowledge of industrial relations will prove to be a major asset.

Getting Right Arbitrator

Q—Since arbitrators have different personal qualifications, experience, and specialties, what can a company do to get the right arbitrator for a particular case?

A (by Mr. B)—That's really leading with your chin. I'd say the answer is to use the American Arbitration Assn.—now let me justify that:

Having been in arbitration for many years, and having seen almost all types of men serve as arbitrators, I have a strong suspicion it's wasted effort when either party seeks an arbitrator with special qualifications. For I've seen men from all walks of life serve as arbitrators and do so most skillfully.

When we receive a request for arbitration we carefully determine the nature of the conflict. And should we find it involves a work assignment, job evaluation, or similar technical subject, we make it a point to include in the list, submitted to the parties, arbitrators we consider competent to decide the particular case.

On occasion there are difficulties. One is in obtaining engineers as arbitrators. A major reason is that engineers have been trained by management to do studies for them, and so the unions feel such men have a management point of view.

Of course, unions now have engineers also. And management seldom will accept one of these men when it thinks he's apt to be 'union biased'.

For checking by those who name our Association in their contracts, we have considerable information regarding the experience and qualifications of the men on our list of arbitrators. And, frankly, we'd like to see union and management take more advantage of this information.

Equity Is Criterion

Q—Is it important that an arbitrator have knowledge of the law and legal matters?"

A (by Mr. B.)—It's not necessary, since arbitrators are bound here by equity and not by laws—except as regards contract agreement of the parties.

However, there are rules to consider, among them the 'rule of evidence.' Thus an arbitrator may not obtain evidence outside the proceedings and make it the basis of his decision—unless both parties have full knowledge of such evidence and ample opportunity to examine and controvert it.

When to Hire Lawyers

Q—Is it advisable for the two sides to be represented by lawyers?

A (by Mr. B.)—This depends entirely on the party's own ability to keep calm, present the case accurately, and not overlook necessary information. A naturally calm person who can be objective should be able to do it.

On the other hand, lawyers are trained to marshal evidence, evaluate it, and present it effectively. Further, no lawyer is easily upset by being called a name by his adversary.

Yet, if you know how to assemble facts and 'sell a bill of goods'—as does a salesman—you should be able to handle your own case.

Special Pleaders for Special Cases

Q—Would you need a lawyer for special cases—say those involving job evaluations and time studies?

A (by Mr. B.)—Well, here the company's engineer, or an outside consulting engineer, might make a better presentation than a lawyer.

Comment by Mr. J.—If a lawyer is engaged for an arbitration case, he should be one familiar with the labor situation as well as with the techniques and craftsmanship involved in arbitration.

Rules of Conduct

Q—Although in comparison with court proceedings, arbitration is informal, aren't there, nevertheless, some specific rules for its conduct?

A (by Mr. B.)—Our Association believes arbitration is a judicial process, since the objective is determination of the rights of the parties. Therefore, we aim to have the procedures conducted with suitable decorum.

Handling the Issues

Q—Will arbitrators permit parties to examine witnesses and bring in issues in any way they please?

A (by Mr. B.)—Our procedure rules suggest that a claimant shall state the case first and present the evidence. Then the other side shall be heard. However, depending on the wishes of the parties, procedures can be varied.

In general, arbitration follows court procedure. But since it is voluntary, as far as possible, the parties engaged are allowed to control it.

End (Resume reading on page 66)

Hawaii's Exotic Fruits

—Continued from page 100

the Islands. Papaya of good quality has long been cultivated by truck farmers. But guava is harvested from wild trees and, because of lack of cultivation, this fruit has lacked desired uniform qualities.

Here, new developments are most inviting, since one of the guava's chief virtues is its high vitamin C content—roughly five times that of orange juice.

Recently, the Hawaiian Agriculture Experiment Station suggested the selection of seedling stock from trees with desirable characteristics, to be later improved by bud grafting from even better varieties. Thus projected is a larger fruit with smaller seed cavities for boosting the puree recovery rate to 90% (average now is 75%).

Also seen are: More soluble solids in a juicier fruit; a more uniform acid content; and a standard, pinker variety with higher consistency on the score of vitamin C content.

Such uniformity would eliminate the need to add sugar to offset over-acid juice, or to artificially acidify low-acid juice. Further, no artificial coloring would be required.

Mainland Moves

One Fullerton, Calif., organization —Pacific Citrus Co.—makes heavy purchase of the passion fruit juice for use in its product, "Hawaiian Punch."

And now, too, there is word that Beatrice Foods interests plan ice cream bases of guava, papaya, and passion fruit, as well as frozen tropical cocktail.

End (Resume reading on page 103)

STANODRIP *Oil whips lubrication problem at Wilson Milk Company*

Taylor Wiham, Wilson Milk Company (right), and John Pirtle, Standard Oil lubrication specialist, inspect oil stain on otherwise spotless floor, the result of previous oil leakage from overhead hydraulic bin loader. Leakage has been eliminated through use of STANODRIP Oil No. 29. Helping customers with lubrication problems is something John Pirtle is well equipped for. John has an engineering degree from Rose Polytechnic Institute, has completed Standard Sales Engineering School and has a number of years of field technical service experience. Customers find this experience and training pay off *for them.*

MANAGEMENT OF THE Wilson Milk Company plant, Sheridan, Indiana, had a serious lubrication problem. STANODRIP Oil solved it.

In overhead bin loaders, hydraulic rams push powdered milk along conveyor chute to weighing machine. Leakage of lubricant from rams on the floor below caused a sanitary and safety problem. Packings were replaced every two months but leakage often recurred as early as two weeks after packing replacement.

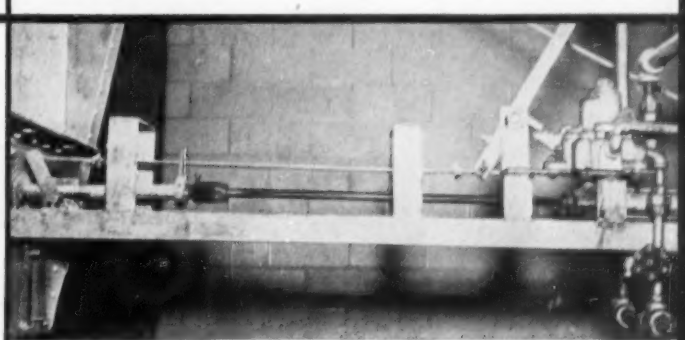
Then Mr. Taylor Wiham, Assistant Superintendent, called in John Pirtle, Standard Oil Industrial lubrication specialist. Mr. Wiham asked about STANODRIP Oil and its possible use as a solution to this lubrication problem. Decision was made to convert to STANODRIP Oil No. 29. Old oil was removed, packings replaced and STANODRIP installed.

In more than 8 months since installation of STANODRIP Oil, there has been no leakage, no packing replacement. Hydraulic rams are lubricated without oil dripping or creeping.

Maybe STANODRIP Oil can serve you as it has Wilson Milk Company. Find out. In the Midwest, call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

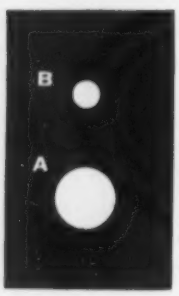
STANDARD OIL COMPANY
(Indiana)



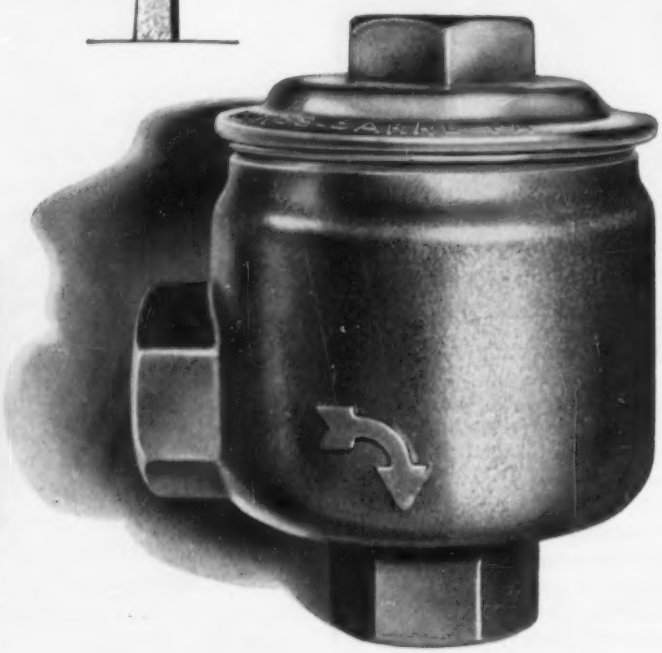
Three bin loaders like the one shown here dripped oil until converted to STANODRIP. No leaks have occurred in 8 months since. Previously, packings were replaced every two months. Even then leakage often recurred as early as two weeks after repacking.

TALK ABOUT

Capacity



Discharge orifice of 1" NICHOLSON trap (A) compared with other types of same size (B). Nicholson's greater—in every size!



Compare capacity of a Nicholson Steam Trap with any other trap of same size. Greater capacity—right across the board—means Nicholson Industrial Traps discharge condensate and air from steam lines and process equipment *faster*, more *effectively*. In toughest food processing service, Nicholson's pay off 4 ways:

- **lower initial cost—more for the money**
- **less upkeep expense—minor maintenance**
- **faster warmup—high, even temperatures**
- **faster production—increased 20% to 30%**

Where performance counts, specify Nicholson. Write for *Catalog 953*.

NICHOLSON

W. H. NICHOLSON and Company

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Cites Meat Packaging Rise

Use of packaging materials by meat packers will continue to accelerate with the trend toward "customized" cuts and new products, declares Clarence K. Wiesman, food research department manager, Armour and Company.

Two recent packaging developments he particularly noted as aids to processors, are polyethylene-laminated kraft paper and pastel green market paper.

The former meets requirements as a good frozen meat wrapper, giving meat a smooth glossy surface. Latter enhances appearance of fresh meat because product appears redder against the opposite color.

"Super-Chill" Proved Safe

Libby, McNeill & Libby's experimental shipment of "super-chilled" frozen foods, sent to Venezuela on the deck of a ship (FE Sept., p. 65), stayed below zero all the way, reports E. A. Olsen, Libby general traffic manager.

On arrival, average package temperature was −35 F. Highest inside reading found was −2 deg.

Novel shipping method involved packing cartoned foods in a special aluminum case, then nitrogen-freezing them to −150 F.

Weed Killer Effects Flour

While 2,4-D weed-killer is effective in controlling wheat field weeds, use of more than the recommended amount can lower baking qualities of resulting flour, say Purdue U. researchers in *Farm Journal*.

After spraying wheat with the compound at various growing stages, the scientists discovered that excesses change wheat proteins enough to keep batters from rising.

Sugar Yield Up, Price Low

A record Hawaiian sugar crop of 1,126,756 tons seems assured for 1955, says Hawaiian Sugar Planters Assn. This will be 27,440 tons over the previous 1,099,316-ton high (1953).

However, this year's harvest is expected to bring in only $140,000,000 as against 1953's $148,000,000 because prices are lower today.

Antibiotic Use in Dressed Chicken Wins Food & Drug Approval

In a precedent-making move, Food & Drug Administration has approved use of the antibiotic Aureomycin for preserving poultry. It has set up a 7 ppm. tolerance for the drug on the uncooked, dressed birds.

However, in giving approval, FDA specifies that this tolerance must not be exceeded anywhere on the bird—and they will not allow averaging of readings from different parts of the chicken. Tests show breast meat absorbs slightly more antibiotic than the thighs.

Approval came within a month after the maker, American Cyanamid Co., filed application under the Miller Pesticide Amendment for a 23 ppm. tolerance.

Under this Amendment, uncooked chicken is classed as a "raw agricultural commodity". Thus, the antibiotic used in processing it becomes, by definition, a pesticide. This "loophole" enabled speedier handling of the approval than would have been possible under the normal procedure of amending a Standard of Identity.

According to Cyanamid, process may be used this way:

About 10 ppm. of Aureomycin will be added to the chilling bath, which normally follows evisceration of the birds. No other change in procedure is necessary. Birds pick up the 7 ppm. while passing through bath.

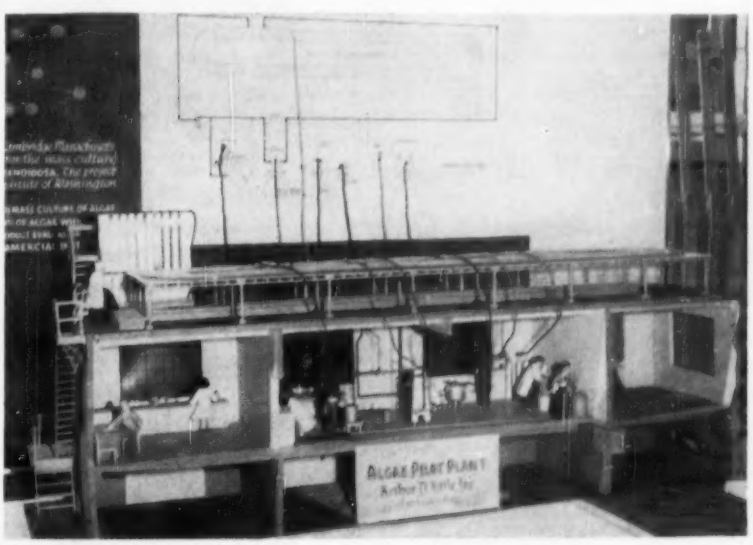
Laboratory tests show that dressed poultry life can be doubled or tripled by use of the drug.

Top FDA officials point out they are inclined favorably only because Cyanamid has presented evidence to prove: (1) That use of the material will give added protection to the consumer, (2) it will not merely replace basic sanitation procedures, and (3) that in cooking poultry, antibiotic is destroyed, leaving no harmful end-products.

This sign is far from a blanket endorsement by FDA of antibiotic use in preservation.

It does, however, set up standards for what to expect from the agency in the future. Applications are in the

(*Continued in 3rd column, next page*)



New Food From Sun?

MASS PRODUCTION of Chlorella algae is shown in this model pilot plant, exhibited at first World Symposium on Applied Solar Energy, Phoenix, Ariz. Because certain algae can be grown faster than regular crops, scientists are hopeful method will yield a new source of human food. Growing tank is on roof—exposed to sun.

Eating Fat Needn't Mean Getting Fat

Significant Study Confirms Fat As a "Must" For Balanced Diet and Improved Health

Diets heavy in fat do not necessarily produce overweight. This is the conclusion of a major nutrition study undertaken by Texas State College for Women, Denton, Tex., and sponsored by Lever Bros.

In fact, fat is shown to be an essential factor in the well-balanced diet designed to combat certain physical failures of America's 'teen-agers.

Under the direction of Dr. Pauline Beery Mack, some 122 students took part in the research. They were divided into four groups, each of which followed the same basic menu except for amount and kind of fat. This was varied from a low of 12.2% up to 35% of total calorie intake.

Not a single girl on the high fat diet became overweight. In fact, some overweight students actually lost weight. Meanwhile some underweight girls developed to proper weight range.

In contrast, 70% of the heavy students on low fat diets stayed overweight.

Further, girls on greater fat diets gained improved skin beauty and more energy. Also, fat containing vitamin A boosted hemoglobin (red coloring matter in blood), improved bone mineralization, and gave a marked reduction in night blindness.

Research was conducted as part of a long-range program by Lever Bros. Co. to investigate poor 'teen-age eating habits and explore the role of fat in the well-balanced diet.

Food Men Get Chance To Criticize Red Tape

Processors now have a chance to criticize government paperwork—and get results.

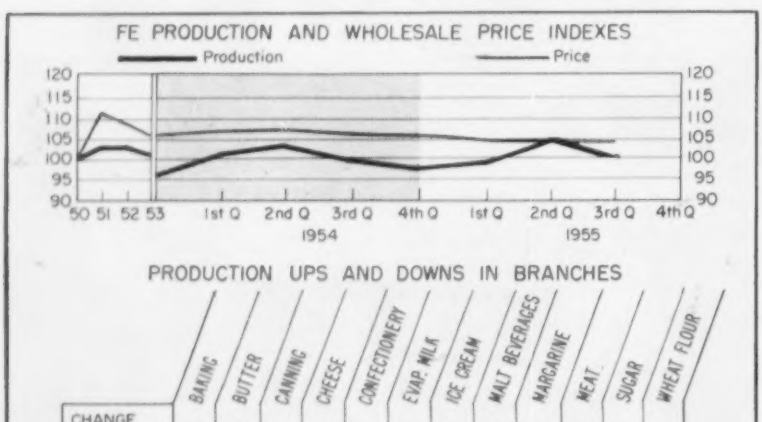
The Advisory Council on Federal Reports, which reviews government report forms and questionnaires for the Bureau of the Budget, is responding to Hoover Commission recommendations by setting up committees to study plant and equipment reports, accident forms, and all paperwork connected with employment and tax matters.

As part of this drive to avoid duplication and simplify longwinded requests for information, the Council invites processors to submit examples of unnecessary or overly-burdensome paperwork.

Three criteria are suggested for evaluating whether or not a questionnaire can be improved:

1. Could information requested be more easily gathered if the question were asked differently?
2. Does it appear to duplicate other requests by Government agencies?
3. Does it appear that the purpose of the investigation is not best served by type of data asked for?

Businessmen are asked to submit criticisms to their trade associations or directly to the Council (1001 Connecticut Ave. N. W., Washington 6, D. C.).



THIRD QUARTER REPORT on '55 shows production falling 5 points to the 100 level—the fourth time it has shuttled to this key line since early '54. Meanwhile, the price reading continues generally level to 104. Note in branch readings the continued strong figure for canning and steady gains in ice cream and sugar.

Protest Candy Tariff Plan

Strong opposition has been registered by two trade associations to a proposed further cut in import duties on confectionery products, such as sugar candy and sweetened and unsweetened chocolate.

Appearing before the U.S. Tariff Commission and Committee for Reciprocity Information, Harry R. Chapman, v.-p. of the National Confectioners' Assn., and Clive C. Day, president, Assn. of Cocoa & Chocolate Manufacturers, stated that competition from imported candies, even under present tariffs, is extremely unfair.

They declared that foreign manufacturers enjoy the advantage of much lower ingredient prices, because milk, sugar, and nuts can only be bought in this country in highly protected markets.

It was urged that duties be increased to end unequal U.S. and Foreign production costs.

Antibiotics (Cont'd)

works covering use of other drugs such as Pfizer's Terramycin (for beef and seafood). But before approval can come, applicant must meet the three criteria above. All are important, and the third may be the most difficult to demonstrate. Proving that there are no harmful residues is a difficult job. Hence, there isn't much chance soon for wide-scale use of antibiotics in food preservation.

FDA is very reluctant to think about further uses. The method reported at FDA's November symposium in Washington, in which antibiotics are injected into veins of a newly slaughtered animal, may eventually be approved. But it isn't imminent.

Even further away is possibility of using these compounds in processed or manufactured foods. First chance would be in such cases where a food is always cooked by the consumer. But, until there has been some experience with use on poultry and meats, this idea won't get approval.

And there's no chance that Food & Drug will okay use on or in dairy products—because such items, especially fluid milk, are a major part of infant and invalid diets.

No Can Opener Needed

EASILY REMOVED snap-type can closure features new quart beer container, recently announced by Pabst Brewing Co. Lids can be removed without a can opener by inserting bottom rim of one can under cap rim of another, then prying apart.

Hors d'Oeuvres

▶ Sight of a small child at prayer, with arms crossed over breast, is said to have inspired the first twisted pretzel. We'd always supposed that the baker just didn't know what else to do with the loose ends.

▶ **Following the lead of poultry packers, some meat firms are taking a hand in raising the animals which they process. They're going whole hog into the meat business.**

▶ Life expectancy among wage earners and their families has increased from 34 years in 1878-79 to 69.8 years today. Not only have we never had it so good, but we've never had it so long.

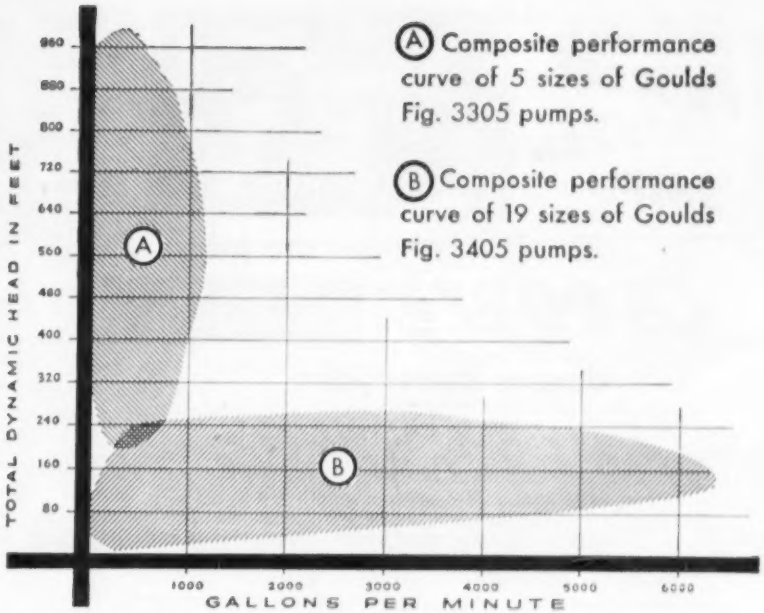
▶ **Boys have better teeth than girls, reports Montana Agricultural Experiment Station. Maybe the girls chew the fat too much.**

▶ Steak is America's favorite food, a *Look* survey shows. Roast beef and fried chicken are second and third choices. Nothing cheap about our tastes.

▶ **Rear Admiral Richard E. Byrd proposes that surplus foods be stored in Nature's great Antarctic deep freezer. Trouble is, even frozen foods are perishable. But then they may as well deteriorate under free refrigeration.**

▶ Our population has passed 166,000,000, for a gain of about 15,000,000 since the 1950 census. Stork & Co. pays nice dividends.

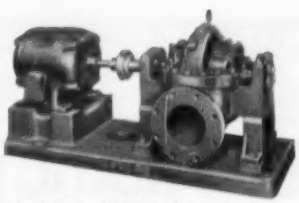
▶ **Some 3,700,000 more families drink beer and ale at home than was the case five years ago. Perhaps because they go to the refrigerator to get away from TV beer commercials.**



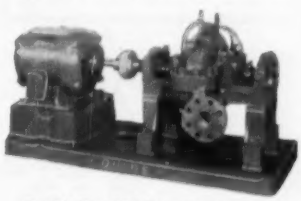
Ⓐ Composite performance curve of 5 sizes of Goulds Fig. 3305 pumps.

Ⓑ Composite performance curve of 19 sizes of Goulds Fig. 3405 pumps.

Do you need pumping capacity? . . . or head? . . . or both?



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

MEMBER HYDRAULIC INSTITUTE U.S.A.

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Rugged galvanized steel construction for longer service. Open mesh feature permits easier sterilizing with steam or scalding water—allows circulation of air or liquids around products in process . . . and prevents fruits, vegetables and other products from rolling off.

Stretch-free FLEXIBILITY eliminates jump or slippage that wears belt edges and pulley stands. Provides perfectly flat, silk-smooth ride for containers empty or full. Choose La Porte for tops in performance—and *dependability.*

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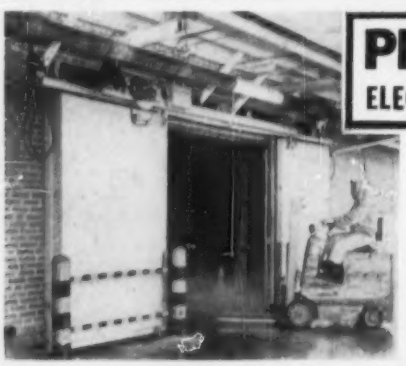

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ELECTRIC COLD STORAGE DOORS

are FAST, SAFE and AUTOMATIC

Truck passage through doorways is completed in 8-10 seconds. Truck operator does not stop forward motion as doors open and close automatically by remote control. Electrically operated doors slide open or shut in as little as 2½ seconds. Safety edge opens doors automatically if closing upon obstruction.

Users report increased efficiency in moving goods—"open-door-time" is reduced up to 75%, resulting in substantial savings in refrigeration and maintenance of lower temperatures.

PREST-O-MATIC doors are complete, packaged units, easily installed against any wall opening without loss of floor space. Full width of doorway is usable.

Send for complete information or consult your architect.

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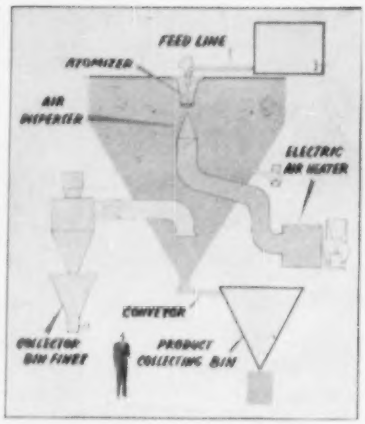


Colloid Layer Ups Quality Of Quick-Dried Flavors

With its new spray-drying plant at Boonton, N. J., geared to economical, large-scale production, Norda, Inc., announces availability of improved imitation and natural dry flavorings.

It says its drying technique encloses flavor particles in a thin colloidal layer, which curbs subsequent oxidation and evaporation. And loss of original flavor is reported minimized by speed of the operation.

Seen in near future are spray-dried natural fruit flavors that keep for several years, and stable, dried fruit juices with flavor quality closely simulating that of fresh juice. Also to be offered is whole spray-dried powdered fruit, for which many new applications are envisioned.

Capacity of the stainless-steel installation (designed in cooperation with Nichols Engineering & Research Corp., N. Y. C.) is some 375 lb./hr. of powder. To prevent product contamination, filtered electrically-heated air replaces combustion gases usually employed in spray drying. Air at 450 F. enters an 18-ft.-dia. chamber at about 5,000 cu. ft. per min.

Important to quality and dryer performance are forced-air cooling of the dryer walls and use of a hot-air disperser directly under the centrifugal atomizer. Automatic controls regulate temperature, air flow, and spray size for product uniformity.

ICC Extends 15% Rate Hike

Railroads have now been authorized by ICC to continue the 15% freight rate increases granted in 1951 and again in 1952.

The extra charges otherwise would have expired Dec. 31.

The '52 order allows a maximum increase of 12c. per 100 lb. on carload shipments of canned or preserved food products.

FDA Proscribes Three Coal Tar Colors
Processors, Makers Plan Protests

Notice has been served by FDA that, starting Feb. 14, 1956, it will bar use in foods of three coal tar dyes—FD&C Red 32, and Orange 1 and 2.

To do this, Agency will simply remove materials from its list of dyes certified for use in foods. Colors can still be used. But the foods in which they appear will be liable for seizure.

However, the decision is sure to be contested, for these dyes now find use in coloring butter, margarine, cheese, candy, baked goods, carbonated beverages, desserts, and hot dogs. Red 32 and Orange 2 are used in coloring skins of Florida oranges—and it is here that greatest protests will be heard.

Already, dire forecasts are being made. A spokesman for one growers' cooperative says, "Some long-time processors feel that this could put Florida out of the fresh citrus fruit business. It is really serious."

To understand this situation, it should be noted that California fruit ripens naturally to an orange color, and thus does not need dyeing.

Citrus research, conducted since FDA first indicated three years ago it was considering action, has so far failed to turn up a satisfactory substitute for either color.

In announcing its decision, Food & Drug pointed out that current laws provide only for listing those coal-tar colors "that are harmless and suitable for use in food, drugs, and cosmetics." Act does not allow listing toxic colors and limiting their total use to such small amounts that toxicity might be disregarded.

Florida citrus producers point out that colors are used in skins at a 21-ppm. level, and that skins are seldom eaten. They are planning a strong effort to change the law, and their program will reinforce that of food additive manufacturers, who plan to press for legislation next year.

Chemical makers have claimed for some time that if a material is safe for use at a specific maximum level, then there is no reason for banning it just because it is toxic at 100 to 1,000 times such level.

The National Assn. of Margarine Manufacturers advised members some time ago to consider substituting natural vegetable dyes for the coal-tar colors. Either annatto or carotene can be used in margarine, but are more expensive. Hence, no maker could afford to switch until the others did.

Booming Sales Break Rule

Food spending is headed toward a record-breaking $68 billion this year, says Paul S. Willis, president of Grocery Manufacturers of America.

The amazing thing about this rise—from $16 billion back in 1939—is that it cannot be explained by population increase alone, he continues.

Overthrown here is the old rule that disposable salary spent for food decreases as income rises. Today, 25% of this income is being spent on food, as against 23% in 1939. And for this the customer now receives a basket of groceries nearly 50% improved in terms of quality, quantity, packaging, and conveniences, asserts President Willis.

But while predicting an expenditure of $100 billion within the next 10 years, he cautions that many food purchases are already in a "discretionary category." And sales will continue to grow only if food men make them.

Winter Dairy Studies

Short courses and conferences in milk and dairy products are slated at following universities and colleges during the coming months:

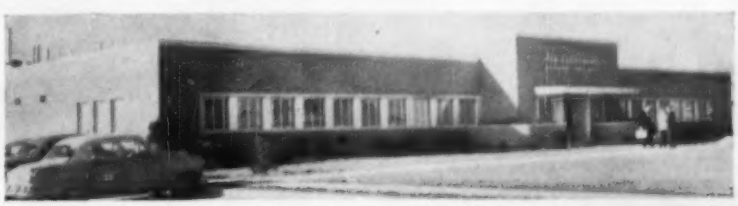
Pennsylvania State U.—Testing Milk, Cream & Dairy Products, Jan. 2-7; Plant Men's Ice Cream Conference, Jan. 9-21; Market Milk & Milk Supervision, Jan. 23-Feb. 4. Purdue U.—Milk & Cottage Cheese Short Course, Jan. 3-7; Milk & Cream Grading & Testing, Jan. 23-27; Ice Cream Making. Feb. 6-10. Michigan State U.—Market Milk Short Course, Jan. 9-20; Laboratory Methods, Jan. 23-Feb. 3; Ice Cream, Feb. 6-17; Cultured Products, Feb. 20-Mar. 3; Dairy Eng. Conference, Mar. 13-14. Ohio State U:—Ice cream Short Sourse, Jan. 9-20; Dairy Technology Conference, Feb. 7-10; Milk Sanitarians Short Course, Mar. 12-16. U. of Maryland—Ice Cream Short Course, Jan. 23-Feb. 2; Ice Cream Conference, Feb. 2. Oregon State College—Annual Short Course & Convention, Feb. 13-16. State College of Washington—Institute of Dairying, Mar. 12-15. U. of Georgia—Soft Ice Cream Conference, Mar. 13; Cultured Products, Mar. 14-15; Sanitarians, April 10. Rutgers University—Ice Cream Short Course, Jan. 3-12; Ice Cream Conference, Jan. 13; Milk Testing, Jan. 16-19; Milk Conference, Jan. 20. U. of Arizona—Dairy Industry Conference, Jan. 25-26.

A-Blast Foods Pass Test

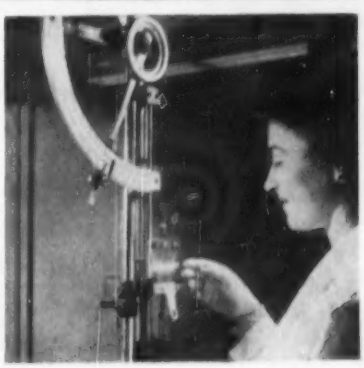
Canned foods exposed to A-blast rays last spring have been found just as nutritious as before the explosion, reports George B. Morrill, president, National Canners Assn.

Result of tests conducted by Wisconsin Alumni Research Foundation shows that two important nutrients, niacin and riboflavin, were unaffected in many foods, and suffered only slight loss in others.

Further, there was no drop in carotene content, says President Morrill, and most products retained over 80% of their thiamine and better than 90% of their ascorbic acid—thus remaining well within normal commercial range.



▲ MILLION DOLLAR technical service lab recently opened by the Du Pont will speed exploration of new uses for Mylar, cellophane, and acetate films.



FULLY EQUIPPED to duplicate customer packaging problems, research center contains such apparatus as this tester, which gages heat-seal strength of plastic films. ➔

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SCIENTIFIC STARCH and WATER SOLUBLE GUM SERVICE

We manufacture laboratory controlled Water Soluble Gums and Starch Products. Our years of experience in developing and supplying these products for the most quality conscious firms in your industry, can be useful to you. Tell us your needs. Our modern line is sure to answer your problems.

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Gum Karaya
Locust Bean Gum
Gum Tragacanth
Irish Moss

STARCH PRODUCTS
Arrowroot Flour
Potato Starch
Tapioca Flour
Instant Pudding Base
Precooked Starches
Dextrines—
Yellow and White

SEND FOR our Water Soluble Gum Inquiry Sheet. You fill in and return it for analysis and recommendations.

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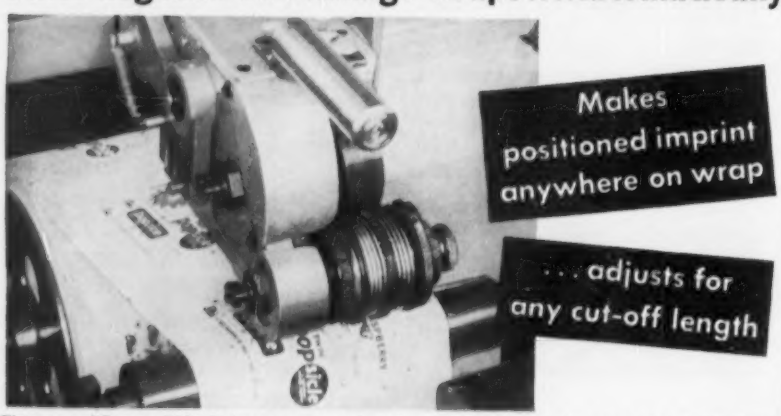
New Wrapping Machine Attachment Prints Codes, Other Legends on Package Wraps...Automatically



This new "Series 700" Rolaprinter unit by Gottscho answers the need for a compact, precision wrapping machine attachment that prints code-dates, flavors, weights, colors, brands or other identification copy on wraps as part of the wrapping operation. Fully automatic, with its own variable speed motor drive and positioning mechanism, the "Series 700" Rolaprinter unit accurately registers its imprint in any pre-selected location on the wrap . . . can be set for any desired printing repeat. Uses fast-drying, brilliant, permanent flexographic inks to print cellophane, polyethylene, glassine, foil, paper, other materials. Designed for quick copy changes.

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Automatic
CODING, MARKING, IMPRINTING MACHINES

Briefly . . .

• METAL TUBES for foods registered a 23.5% gain over '54 figures in the first nine months of '55, according to Collapsible Tube Manufacturers Council. Shipments in September stood at 584,208 units —a record figure.

• FISH fare better in the city than the country, says Fish & Wildlife Service. Nationwide survey reveals that urbanites consume twice as many breaded shrimp and three times as many fish sticks as their country cousins.

• MINUTE MAID plans issue of 400,000 new shares of common stock says John M. Fox, president.

• FROZEN FOODS will chalk up another record this year with production of an estimated 260,000,000 lb. of frozen strawberries—26,000,000 lb. more than '54, says National Assn. of Frozen Food Packers.

• PREPACKAGING takes another stride with development of a water-proof peach carton, which enables packaged fruit to be hydro-cooled, thus cuts one handling.

• SAFETY AWARD has been presented to U. S. Brewers Foundation by the National Safety Congress. Cited were Foundation's outstanding efforts toward accident prevention.

• FISH STICKS are liked by Britishers, too, reports Fish & Wildlife Service. Four firms now produce the tasty morsels in England and are installing additional new equipment to keep pace with orders.

• USE OF ROOF DECKING of precast concrete is rising in the food industry. A survey notes that more than 15,000,000 sq. ft. were laid in the past decade at 664 processing locations.

Acknowledgment

To R. H. Forsythe, Henningsen, Inc., goes credit for information in the article "5 Egg-Quality Properties Important to Food Processors," (FE Sept., p. 85). Mr. Forsythe was mentioned among those who contributed to special egg solids report, but specific article reference was inadvertently omitted.—*The Editors*

Action on Standards

Following decisions have been made by the Agricultural Marketing Service (AMS) and Food & Drug Administration (FDA) on U. S. Standards and Standards of Identity, quality and fill of container, and allowable tolerances of various pesticides on raw agricultural commodities. References are to *Federal Register*.

Monterey cheese, final promulgation of FDA Standard of Identity, Oct. 21 F. R., p. 7926.

Cottage cheese, partially creamed, FDA decision not to adopt Standard of Identity, Oct. 21 F. R., p. 7944.

Cocoa products, cheeses and related foods, canned fruits, fruit butters, tomato products, amendment of Standards of Identity to permit optional use of glucose sirup, Oct. 27 F. R., p. 8073. Minor correction, Nov. 1 F. R., p. 8189.

Prune juice, canned, proposed Standard of Identity, Oct. 28 F. R., p. 8125.

Orange juice, frozen concentrate, AMS revision of U. S. Standards, F. R. No. 2, p. 8207.

Insecticide tolerances on commodities: *On apples, peaches and pears,* of Sulphenone, final establishment, Oct. 25 F. R., p. 7990.

On a broad list of raw agricultural fruits, vegetables and grains, of Aldrin and Dieldrin, proposed establishment, Nov. 3 F. R., p. 8268, Nov. 4 F. R., p. 8315.

On dressed poultry, of chlortetracycline antibiotic, proposed establishment, Nov. 3 F. R., p. 8268.

General extension of Miller Amendment effective date for Aldrin, Allethrin, calcium cyanide, Chlordane, Dieldrin, Endrin EPN, ethylene dibromide, Ferbam, hydrocyanic acid, Lindane, Methoxychlor, methyl bromide, Parathion, Phygon, piperonyl butoxide, pyrethrins, Toxaphene, Zineb, Ziram, butoxypolypropylene glycol, carbon bisulfide, carbon tetrachloride, chloropicrin, copper carbonate, DDT (in meat), ethylene dichloride, sodium orthophenylphenate tetrahydrate, and trichlorethane, Oct. 29 F. R., p. 8156.

For Captan, Nov. 5 F. R., p. 8329.

Schedule of Events

December

11–13—Materials Handling Institute; Statler Hotel, New York City.

12–16—Nuclear Engineering & Science Congress, exposition; Public Auditorium, Cleveland.

January '56

15–19—U. S. Brewers Foundation, annual convention; Roosevelt Hotel, New Orleans.

18–23—National Canners Assn., Canning Machinery & Supplies Assn., overall convention and exposition; Convention Hall, Atlantic City, N. J.

23–26—Plant Maintenance & Engineering Show; Convention Hall, Philadelphia.

24–27—American Management Assn., general management conference; Hotel Fairmont, San Francisco.

29–F1—National Frozen Food Distributors Assn., convention & exposition; Belmont Plaza (foods) and Waldorf-Astoria (equipment & supplies) Hotels, New York City.

30–F1—National Dairy Council, annual meeting & winter conference; Hotel Roosevelt, New York City.

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Refrigeration

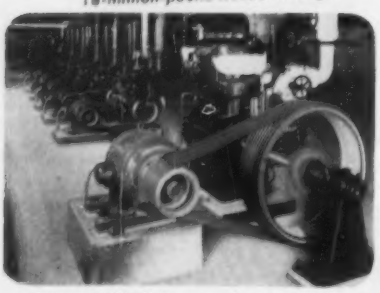
Frick square-finned coils cool the 18-million-pound freezer storage.

Carries the load at the Southern Michigan Cold Storage . . . measuring 324 by 160 feet . . . lately built near Benton Harbor.

Here eleven Frick ammonia compressors quick-freeze 375,000 pounds of foods daily at minus 30 degrees; store 18,000,000 pounds at zero; and hold a 75,000-bushel storage for fresh fruit at plus 30.

The frozen-food storage is cooled with 6,440 feet of the new Frick square-finned ceiling coils. Installation by Hayes Brothers, Inc., Frick Distributors at Indianapolis and South Bend.

Whether you need air conditioning, ice making, quick freezing, or other refrigerating services, you're safest when you specify FRICK. Write now for literature and estimates.



Battery of 11 Frick ammonia compressors at So. Mich. Cold Storage Co.

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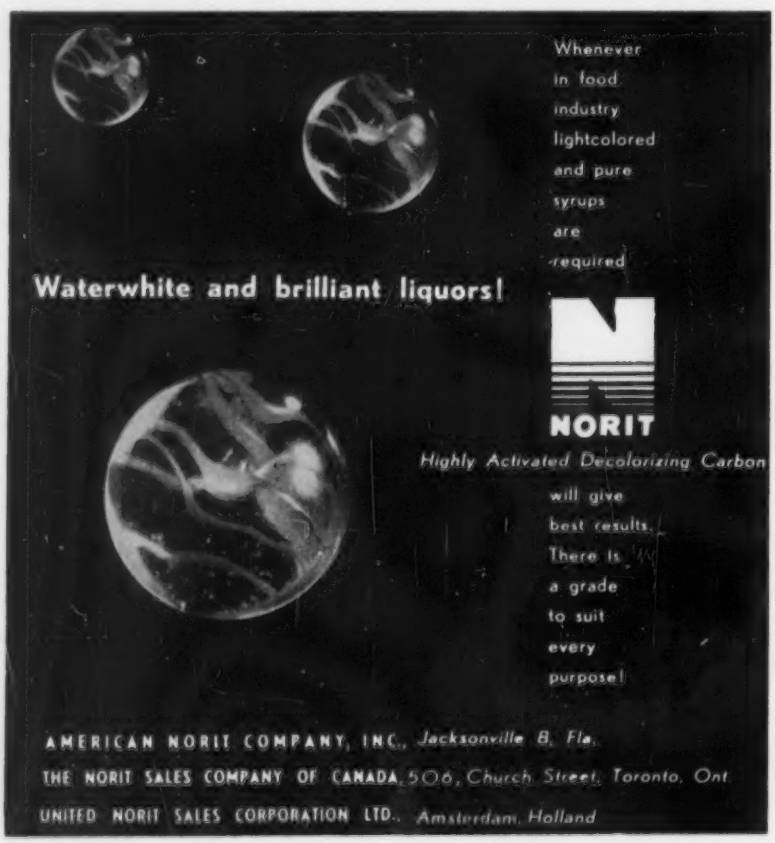
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Fumigation Safety

—*Continued from page 67*

drawings), with specific design to eliminate leakage of the hazardous gas into our candy factory. Key switch, for instance, is locked to prevent anyone but the man operating the fumigator to start the fumigation cycle, and to guard against any accidental activations.

Added Safety Devices

Furthermore, fumigation can't start until vault door and exhaust duct slide-gate are tightly closed. For if either are opened, microswitches will break the electric circuit, preventing fumigation and accidental release of fumigant into the room.

Leakage is also eliminated through use of air-tight solenoids, gages, valves, and filter unit.

Pressure control also safeguards the glass applicator in event of excess pressure building up in the cylinder as a result of temperature variations.

End (*Resume reading on page 68*)

Enzyme Protects Pop

—*Continued from page 80*

slightly in transmittancy over wavelength range of 500-550 μ in 1 month tests. Here, a maximum increase of 1% was not considered significant.

Measurements after 3 months' storage, however, showed definite bleaching, as indicated by increased transmittancy over range of 365-550 μ.

Furthermore, fading was even more pronounced after storage for 6 months. Maximum increase in transmittancy was at 520 μ, which was the point of minimum transmittancy in the initial (first-week) absorption curve (see graph and bar chart).

Controls Show Color Change

Thus it can be seen that greater bleaching of canned samples occurred after 3 months' storage—though fading could not be detected at this point by eye. After 6 months, however, canned control samples containing no enzyme were visibly lighter in color. Fact is, in some cans, red color had disappeared completely, leaving beverage an amber color.

Absorption curve of a faded control sample is plotted on the graph with a similar curve for the cola drink.

Bottled samples containing the enzyme solution showed, on the other hand, only slight increases in transmittancy after 3 months' storage.

There was no change in bottle control containing no enzyme. No further increases were noted in any bottled sample after 6 months' storage.

Iron Contents Eyed

Determination of iron contents was made by first wet ashing product, then combining iron with an indicator to form an orthophenanthroline-ferrous complex, which was measured by spectrophotometer[3].

For this task, composite samples were used. These were composed of mixed samples drawn from five cans (40 ml./can) at each enzyme level and from the control.

In each analysis, 25 ml. of this degassed composite were used. And all determinations were carried out in triplicate.

After 6 months' storage, iron analyses were made independently by Continental Can Co. Inconsistent results on cola composites, found by both Continental and Takamine, led to analysis of individual cans by the two laboratories.

Result: Cans of the same code were found to vary widely in iron pickup, especially with controls and cans containing 10 ppm. enzyme solution.

Enzyme Retards Pickup

However, average results (Table III) show that iron pickup in cola beverage was definitely retarded by enzyme presence—though appreciable pickup occurred on long storage. Also, while iron pickup jumped rapidly in control cans of black cherry (no enzyme), it increased but slightly, or not at all, when the enzyme was present.

Check of analyses run by Takamine Laboratory and Continental Can Co. (Table IV) shows good comparability.

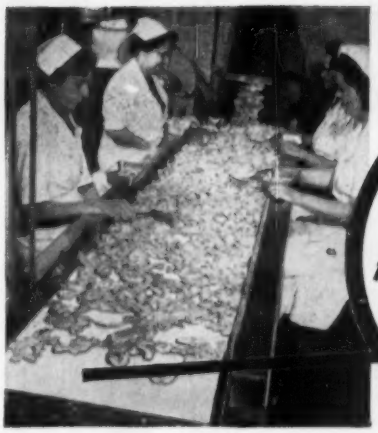
And it is seen that protection afforded cola beverage by the enzyme solution was somewhat variable, while iron pickup in black cherry was successfully prevented with only 10 ppm. of the enzyme.

References

1. Baldwin, R. R., Campbell, H. A., Thiessen, R., and Lorant, G. J., *Food Technology*, 7, No. 7, p. 275, '53.
2. Johnson, H. T., *Food Processing*, 16, No. 9, p. 46, '55.
3. Continental Can Co., *Determination of Iron in Carbonated Beverages*, '55.

Cooperation of H. T. Johnson, Continental Can Co., in helping to plan and conduct experimental work, is gratefully acknowledged by the authors, who also wish to cite the assistance of S. J. Gagan, Dr. T. D. Miller, and others at Takamine Laboratory, for aiding with color and taste tests.

End *(Resume reading on page 81)*



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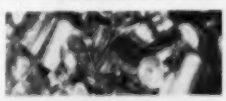

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for lower cost control of moderately **Corrosive** fluids

Fig. 2651-A Gate

JENKINS

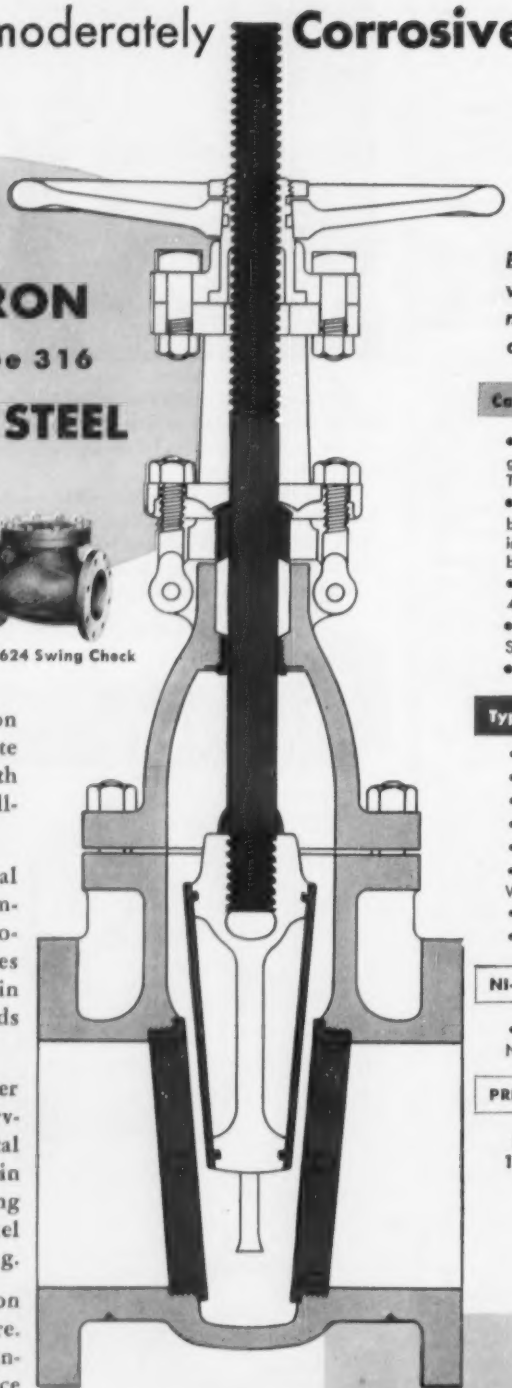
NICKEL IRON

Valves with Type 316

STAINLESS STEEL

Trim

Fig. 2624 Swing Check



Every part in contact with fluid is the right metal to block corrosion and beat wear.

Cast NICKEL IRON

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- **BONNET** Rugged construction, like body. Swing-type gland bolts. Screwed-in back-seating bushing. Deep stuffing box.
- **YOKE** Integral with bonnet in 2" to 4" sizes.
- **WEDGE** In 10" to 24" sizes, with Stainless Steel Wedge Rings.
- **COVER** In Check Valve.

Type 316 STAINLESS STEEL

- SPINDLE
- GLAND
- BONNET BUSHING
- SPINDLE RING
- WEDGE PIN
- WEDGE RINGS Rolled into Nickel Iron Wedge in 10" to 24" sizes.
- SEAT RINGS
- DISC and HANGER in Check Valve

NI-RESIST Type No. 2

- WEDGE of I-beam structure is solid NI-RESIST in 2" to 8" sizes.

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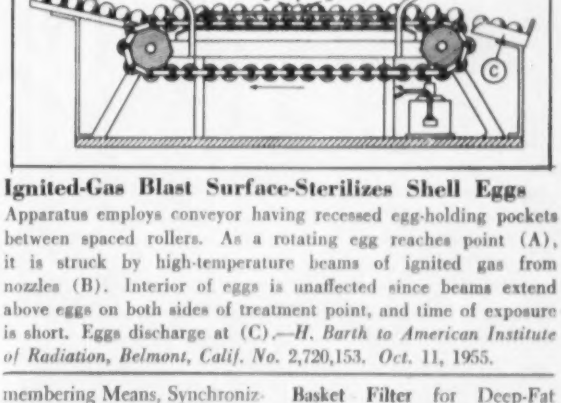

Ignited-Gas Blast Surface-Sterilizes Shell Eggs

Apparatus employs conveyor having recessed egg-holding pockets between spaced rollers. As a rotating egg reaches point (A), it is struck by high-temperature beams of ignited gas from nozzles (B). Interior of eggs is unaffected since beams extend above eggs on both sides of treatment point, and time of exposure is short. Eggs discharge at (C).—*H. Barth to American Institute of Radiation, Belmont, Calif. No.* 2,720,153. *Oct.* 11, 1955.

PRODUCTS

Improved Bakers' Yeast From S. cerevisia Hansen Strain (ATCC No. 11,795) Having Bios No. 23, Glutathione Content Less Than 5.5 Mg. per g. (Dry Basis), and Able to Metabolize Glutathione—A. S. Schultz, New York City, and F. R. Swift, Englewood Cliffs, N. J., to Standard Brands, Inc., New York City. No. 2,717,837. Sept. 13, 1955.

Boiler-Foam Inhibitor Comprising a Symmetrical, Unsaturated Diacyl Polyethylene Polyamine—P. G. Bird and A. L. Jacoby, Western Springs, Ill., to National Aluminate Corp., Chicago. No. 2,717,881. Sept. 13, 1955.

EQUIPMENT

Dryer Comprising Stationary Chute With Peripheral Surface, Feed Mechanism, Helical Baffle, Hot-Gas Inlet, Plenum Chamber—H. F. Irving to Baker Perkins, Inc., Saginaw, Mich. No. 2,716,290. Aug. 30, 1955.

Chip-Ice Machine Consisting of Quick-Freezing Cylinder, Rotating Chambered Head, Liquid Source, Piping, Ice-Film Dislodging Means—E. Ostrom, Oakland, Calif. to Lessard-Lees, Inc., Seattle. No. 2,716,331. Aug. 30, 1955.

In-Stream Viscometer Including Flow Pipe Having Rotation Chamber and Flow Restrictor, Differential-Pressure Responsive Apparatus—F. J. Fontein to Stamicarbon N. V. Heerlen, Holland. No. 2,716,337. Aug. 30, 1955.

Orienting Conveyor for Artichoke Preparation Machine—L. Dotta, San Jose, Calif. No. 2,716,480. Aug. 30, 1955.

Machine for Banding Meat Casings Comprising Fixed Slotted Anvil, Locking Tooth, Fastener-Stapling Head, Spring-Pawl—H. Kelem, Far Rockaway, N. Y. No. 2,716,751. Sept. 6, 1955.

Shrimp-Processing Apparatus Consisting of Conveyor, Dismembering Means, Synchronizing Controls—P. A. Streich, Philadelphia, V. R. Clark, Decatur, and E. P. Tait, Chamblee, Ga., to Tait-Clark-Streich Machinery Corp., Decatur, Ga. No. 2,716,776. Sept. 6, 1955.

Flake-Ice Machine Employing Vertical Drum, Internal Rotor Having Vertically Spaced Knives, Shield, Non-Rotatable Angular Header, Water Outlets—G. M. Lees, to Akshun Mfg. Co., Chicago. No. 2,716,869. Sept. 6, 1955.

Basket Filter for Deep-Fat Fryer—H. L. Smith, Lake Waccamaw, N. C. No. 2,716,938. Sept. 6, 1955.

Automatic Density Regulator Having Test Vessel, Balance Beam, Hydrometer, Inductance Coils, Continuous Sampler, Product-Recycling Means—C. B. Levi to Mc Nally-Pittsburgh Mfg. Corp., Pittsburgh, Kan. No. 2,717,078. Sept. 6.

Control System for Conveyors That Carry Articles From Load-

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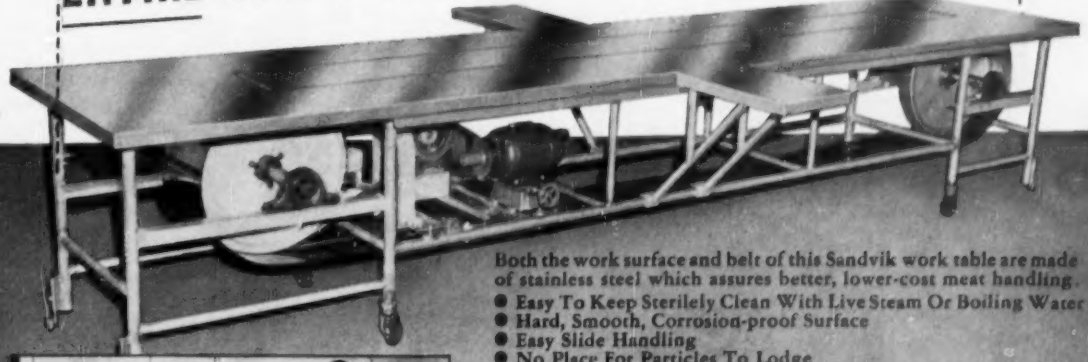
ENTIRE SURFACE, INCLUDING THE BELT IS STAINLESS



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ing Position to Multiple Distribution Points—G. L. Bush, Flushing, N. Y., to Teleregister Corp., Stamford, Conn. No. 2,717,086. Sept. 6, 1955.

Pastry Icer Including Portable Frame, Sealed Tubular Housing, Pump, Piping, Discharge Nozzle—O. Hammer, Pittsburgh. No. 2,717,106. Sept. 6, 1955.

Sausage Stuffer With Air-Operated Cylinder for Opening, Closing Discharge Valves—R. H. Clark, Denver. No. 2,717,113. Sept. 6, 1955.

Centrifugal Separator Consisting of Rotatable Bowl, Separating Chamber, Accelerating-Decelerating Device, Feed Means, Light- and Heavy-Component Outlets—L. D. Jones, Philadelphia, to Sharples Corp. No. 2,717,119. Sept. 6, 1955.

Container-Traversing Device for Heat-Processing of Foods —J. H. Blair, Jr., Milwaukee, to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,717,548. Sept. 13, 1955.

Cookie Machine Comprising Hopper, Extrusion Die, Cutter, Endless Conveyors, Oven Zone —A. A. Kottmann to F. C. Wallace, Bettendorf, Iowa. No. 2,717,560. Sept. 13, 1955.

Feeder Attachment for Whole-Kernel Corn Cutter Including Rotary Conveyor With Turntable Having Ear-Receiving Pockets, Orienting and Discharge Means—J. H. Batzle, Wauwatosa, Wis. No. 2,717,606. Sept. 13, 1955.

Vegetable-Oil Extractor Having Horizontal Tube, Internal Thin-Quartz Plate, Electrically Insulated Windows, High-Frequency Current Source, Mixing Screw—J. Carpentier, La Madeleine, to Societe d'Etudes et de Recherches Industrielles et Chimiques, Lille, France. No. 2,717,768. Sept. 13, 1955.

Gizzard Slitter Employing Spaced Horizontal, Stationary Walls, Upper Inlet, Lower Outlet Openings, Rotating Arm, Knife—R. S. Zebarth, Hickman Mills, to Gordon Johnson Co., Kansas City, Mo. No. 2,718,027. Sept. 20, 1955.

Ice Maker Comprising Water-Holding Tank With Exterior Tubes, Refrigerant Inlet, Restrictor Pipes, Evaporator—J. W. Braswell, Jr., Midway Park, N. C. No. 2,718,123. Sept. 20, 1955.

Safety Arrangement for Pressure Vessels Consisting of Locking Pin, Spring, Pressure-Actuated Diaphragm, Slide Valve, Piston, Air Line—P. F. K. Erbguth, Great Neck, N. Y., to Weston Electrical Instrument Corp., Newark, N. J. No. 2,718,239. Sept. 20, 1955.

Portable Conveyor Having Wheeled Frame, Elevator, Endless Chain, Spaced Flights, Pivoting Side Rails—E. S. Johnson to Better-Bilt Mfg. Co., Minneapolis. No. 2,718,296. Sept. 20, 1955.

Continuous Centrifuge Employing Elongated Rotatable Drum With Longitudinally Encircling, Convoluted Hollow Rib, Inlet, Light-, Heavy-Component Outlets, Rib-Squeezing Roller—W. H. Kelsey, Stockton, Utah. No. 2,718,353. Sept. 20, 1955.

Want more information on any of these recent patents — if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Drying Head for Washed Beverage-Bottle Carriers Employing Elongated Body With Upper, Lower Chambers, Radially Spaced Baffles, Air-Pressure Means—J. J. Bocchino, Dover, N. J. No. 2,718,714. Sept. 27, 1955.

Egg-Separating Machine Comprising Endless Conveyor, Hinged Cups Having Yolk and White Compartments, Product Receptacles, Tripping Means—J. Adams, B. T. Hensgen, and O. A. Clemens, Jr. to Swift & Co., Chicago. No. 2,718,906. Sept. 27, 1955.

PROCESSES

Roasting Coffee Continuously by Conveying Beans Through Roaster and Cooler, Passing Exit Gases to Heater, Recycling Gases—J. L. Kopf, Maplewood, N. J., to Jabez Burns & Sons, Inc., New York City, N. Y. No. 2,716,936. Sept. 6, 1955.

Separating Potatoes From Vines and Stones by Suction Means Which Discharge Vines, Transfer Potatoes to Exit Conveyor, Leave Stones on Feed Belt—C. R. Leighton and N. D. Leighton, Limestone, Me. No. 2,717,077. Sept. 6, 1955.

Producing Cheese Continuously by Rapidly Centrifuging Whey and Curd Mixture, Removing Whey, Cheddaring Curd at Reduced Speed—B. T. Hensgen and J. C. Vanden Bosch, Chicago, A. M. Lederer, New York City, and P. M. Wood, Mamaroneck, N. Y., to Swift & Co., Chicago. No. 2,717,212. Sept. 6, 1955.

Converting Starches to Glucose by Contacting Aqueous Dispersion With Starch-Glucogenase Enzyme Adsorbed on Water-Insoluble Adsorbent, Separating—I. Stone to Wallerstein Co., New York City. No. 2,717,852. Sept. 13, 1955.

Processing Maple Syrup by Concentrating at Atmospheric Pressure in Single Rapid Pass Through Tubular Heater, Holding to Develop Color, Flavor—R. K. Eskew, Glenside, and J. B. Claffey, Philadelphia, to USA. No. 2,718,469. Sept. 20, 1955.

Sterilizing High-Moisture Perishables by Drying to 30-65% Solids, Canning, Heating—V. F. Kaufman, Lafayette, M. J. Powers, San Francisco, and W. F. Talburt, Berkeley, Calif., to USA. No. 2,718,470. Sept. 20, 1955.

Preparing Phytic Acid and Soluble Salts Thereof by Cation Exchange—M. J. Thomas to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,718,523. Sept. 20, 1955.

PACKAGING

Carton Former Having Dies, Vertically Reciprocable Plunger, Horizontal Conveyor With Inclined Guide Means—H. R. Hedlund and K. E. Burnham to Waldorf Paper Products Co., St. Paul, Minn. No. 2,717,541. Sept. 13, 1955.

Labeler Employing Continuously Rotatable Delivery Member Having Label-Holding Suction Openings, Pick-Up Drum, Gumming Device, Movable Label Stack, Sequence-Control Means—S. E. Banks, Sheffield, England. No. 2,717,711. Sept. 13, 1955.

Capping Head for Applying Snap-On Closures to Containers—H. G. Blann, Flushing, to Lily-Tulip Cup Corp., New York City. No. 2,717,730. Sept. 13, 1955.

Winding Key for Removing Container Tear Strip Comprising Slotted Shank, Coiling Guide, Sleeve Means, Detachably Connected Rod—H. W. Bent, Rocky Hill, Conn. No. 2,717,718. Sept. 13, 1955.

Egg Packager Having Row-Accumulating Zone, Intermittent Feed Device, Orienting Conveyors, Clamping and Depositing Means—C. and G. A. Page, Detroit, No. 2,717,729. Sept. 13, 1955.

Wrapping Machine for Fruit Pieces Consisting of Wrapper Wiping and Holding Means, Opposed Elongated Clamping Members, Rack and Pinion Mechanism, Twisting Means—T. M. Vaughan to United Paper Co., Tampa, Fla. No. 2,718,107. Sept. 20, 1955.

Bottle Cap Having Thin Flexible Disk Reinforced by Stiff Sheet, Severable Annular Member—I. L. Wilcox to Oswego Falls Corp., Fulton, N. Y. No. 2,718,322. Sept. 20, 1955.

Bottle Closure With Metal Shell Having Inner Resin-Coated Surface, Fibrous Paperboard Disk Comprising Resin-Coated Faces Peripherally Bonded With Dissimilar Resin—J. P. Kennedy, Andover, Mass. No. 2,718,323. Sept. 20, 1955.

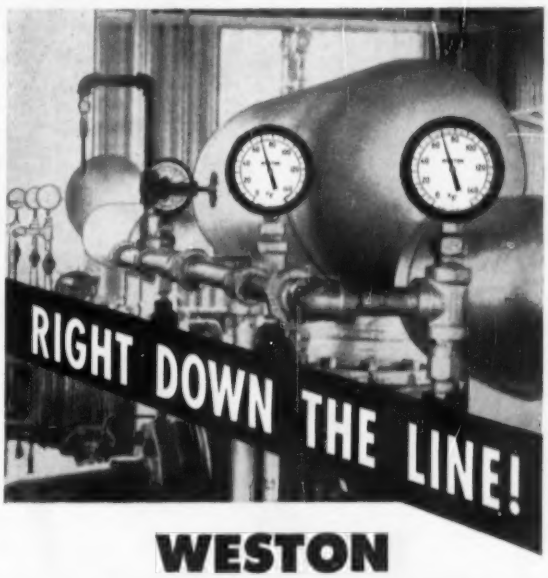
Tearing-Strip Guide for Opening Cans Employing Clasp With Coextensive Inner, Outer Plates Adapted to Receive Winding-Key Shank, Central Openings, Releasable Latch Means—E. Flickinger, Seattle. No. 2,718,329. Sept. 20, 1955.

Vacuum-Filling of Solids Into Container by Evacuating Major Portion of Air From Can, Introducing Inert Gas, Evacuating Gas-Air Mixture, Drawing Product Into Container—S. R. Howard, Milton, to Pneumatic Scale Corp., Quincy, Mass. No. 2,718,345. Sept. 20, 1955.

Apparatus for Removing Upstanding Overfilled Viscous Material From Open-Mouthed Containers—C. L. Day and F. E. Fauth to Crown Cork & Seal Co., Baltimore. No. 2,718,989. Sept. 27, 1955.

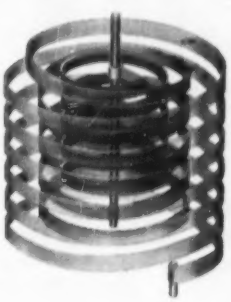
Fish Canner Comprising Bed Adapted to Hold Slices, Slidably Mounted Coextensive Apertured Plate, Rotary Cutter, Slice-Compacting and Can-Filling Means—H. W. McKinnon, New Westminster, British Columbia, Canada. No. 2,718,993. Sept. 27, 1955.

DEPENDABILITY



WESTON THERMOMETERS

with Multiple bimetal helix



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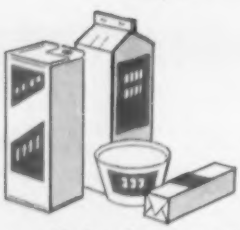
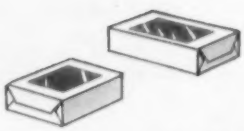


Dairy Cartons get smooth, uniform coatings with A-C POLYETHYLENE-wax combinations. They resist citrus juices, buttermilk, cottage cheese . . . reduce lactic acid absorption. Dairies want these A-C POLYETHYLENE blends to help eliminate leaking and bulging, and make the carton stronger, better-looking.

Bright, colorful packages are sure-fire standouts in any display. Coatings containing A-C POLYETHYLENE give paper the outstanding beauty to attract sales, the "muscle" to resist rough handling.

Bread wrapped in paper coated with A-C POLYETHYLENE-wax blends feels fresh to the touch, stays appetite-appealing. The polymer permits hotter wrapping, helps lock in vitamins, extends shelf life. Wrapper holds gloss longer, too.



Frozen Food Wrappers coated with A-C POLYETHYLENE-wax blends are brilliantly colorful to attract impulse buyers, yet can take rough handling. These new wrappers are not affected by the hot pouring of foods. They withstand cracking at low temperatures without losing gloss, and hold the end seal better, particularly at subzero temperatures.

. . . the package with

A-C* Polyethylene

Dress up your packages with a plastic-like finish. Get the bright, fresh look that means extra sales with low-molecular-weight A-C POLYETHYLENE.

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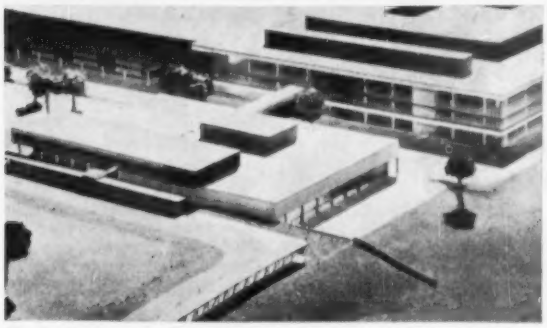


H. J. Heinz Co. Pty. Ltd., Australian subsidiary of H. J. Heinz, has opened a new 460,000 sq. ft. plant near Melbourne, said to be the largest in the Southern Hemisphere. Built at cost of almost $9 million, the factory is capable of making all 57 Heinz varieties and will eventually employ 1,500 people.

Industry

Banquet Canning Co., St. Louis, will add fruit pies to its line of frozen meat pies and turkey dinners.

Calavo, Inc., has merged with its parent company, **Calavo Growers of Calif.**

Canada Packers, Ltd., has purchased **Calgary Packers Co.'s** plant in Calgary, Alberta.

Cott Beverage Corp., New Haven, Conn., has announced it will merge with **Mission Dry Corp.,** Los Angeles.

Dolly Madison International Foods, Ltd., has acquired **June Dairy Products Co. and Western Industries, Inc.** from **Foremost Dairies, Inc.,** through an exchange of stock.

Donovan Coffee Co., Birmingham, has reopened for business after fire caused damage estimated at $1 million.

Home Style Food Products Co., Inc., Waterloo, N. Y., has changed its name to **Greenwood Foods, Inc.**

Kraft Foods Ltd. has changed its head office from Montreal to Mount Royal, Que.

Krier Preserving Co. has begun construction of a new 20,000 sq.ft. warehouse at Random Lake, Wis.

H. W. Lay Co. is installing air conditioning in its main plant in Atlanta.

Libby, McNeil & Libby has acquired a new plant in Lafayette, Ind., designed for production of frozen specialties.

Mah Chena Corp., processor of frozen Chinese foods, has moved into expanded factory facilities in the Union Stock Yards, Chicago.

Minute Maid Corp. intends to apply for listing on the New York Stock Exchange.

Pepsi-Cola has begun operation in a new bottling plant in Belo Horizonte, Brazil.

Pisano French Bread Bakery, San Carlos, Calif., will build a new baking plant at Redwood City, Calif.

Richer Dairy Prod. Co., Columbus, Ohio, and **Iowana Farms Milk Co.,** Bettendorf, Iowa, have merged with **Bowman Dairy Co.,** Chicago.

Schutter Candy Co., Chicago, has been purchased by **U. S. Hoffman Machinery Corp.**

Sicks' Seattle Brewing & Malting Co. has authorized construction of a $2 million beer-packaging center at Seattle.

South Texas Producers Assn., Inc., Houston, plans to build a $1 million milk processing plant near Arlington, Tex.

Personnel

Eugene Allen, Jr., formerly with A & P, is now a food technologist consultant with the U.S. Gov't. International Co-operation Administration and will be assigned to the National Italian Food Production Center in Rome.

Robert Ball has been elected a vice-president of Diamond Crystal Salt Co.

Stanley Benham has been named president of Dairymen's League Co-operative Assn.

Douglas Bradley has been elected president of Angostura-Wuppermann Corp., New York City.

Dr. J. Charles Cavagnol has joined General Foods Corp. as lab director in food analysis.

D. M. Chenoweth has been named general manager of Molson's Brewery Ltd., Montreal.

Dr. Walter Fetzer, chief chemist of Clinton Foods Inc., has been awarded the 1955 medal of Amer. Chemical Society's Iowa Section.

Paul Frisch of McCormick & Co., Inc., Baltimore, has been named president of the Mayonnaise & Salad Dressing Mfrs. Assn.

Wolfgang Huber, independent chemical consultant, will move his office from New York to California, where he will concentrate on fields of applied radiation.

Thomas Humphrey has been appointed a v.-p. of General Mills Ltd., Toronto.

John Jargatis has been named vice-president of Swift & Co., Chicago.

Fred M. Linder, president of Jacob Ruppert Brewery, is new president of the Brewers Board of Trade.

Herbert Mallar has been upped to branch manager of New England Div. of Crosse & Blackwell.

Betty Means has been added to the microbiology staff of Food Research Labs, Inc., Long Island City, N. Y.

James Meehan is now a vice-president of Foremost Dairies, Inc.

Vernon Nofzinger has been promoted to vice-president for manufacturing at Nalley's Inc., Tacoma, Wash.

Louis Nufer, treasurer, has been elected financial v.-p. of Pepsi-Cola Co.

Charles F. O'Brien has been appointed treasurer of C&C Super Corp.

Jean McDougall Page is now full time consultant on food service and nutrition to Mealpack Corp., Evanston, Ill.

C. B. Rasmussen has been promoted to plant manager of Wm. J. Stange Co.'s manufacturing branch, Oakland, Calif.

Ollie Reed, who retired last year as chief of Bureau of Dairy Industry, USDA, will go to Puerto Rico in a governmental advisory post.

J. A. Reivitz has been named v.-p. of Universal Foods Corp., Chicago.

Josephine A. Scheck is now institution and dietetic advisor in the dept. of home economics at Kellogg Co.

Robert Simons has been elected to the board of directors of American Molasses Co., New York City.

D. Glenn Sorber has retired as frozen food contact man for Western Utilization Research Branch of USDA in Albany, Calif.

B. L. Thomas & B. E. Hoover have been upped to asst. general managers of Armour & Co. plants.

Lloyd Volling is now v.-p. in charge of personnel and public relations for Green Giant Co., LeSueur, Minn.

Ben Zakariasen of Land O'Lakes Creameries, Inc., Minneapolis, has been ap-

Fred C. Heinz, vice-president of H. J. Heinz Co., has been elected president of the Quartermaster Assn., a group composed of military and industrial leaders interested in maintaining high standards in supplies furnished the armed forces.

pointed chairman of public relations committee for American Dairy Science Assn.

J. D. Zellerbach, president and director of Crown Zellerbach Corp., has been elected chairman of Committee for Economic Development.

Associated Industries

American Radiator & Standard Sanitary Corp. has formed the **Ross Heat Exchanger Div.** with headquarters in Buffalo, N. Y.

Brockway Glass Co., Inc. has completed negotiations to acquire **Demuth Glass Wks., Inc.,** Parkersburg, W. Va.

A. W. Cash Co., Decatur, Ill., has purchased business of **Farris Stacon Corp.,** Palisades Pk., N. J.

Container Corp. of America will build a new boxboard mill in Santa Clara, Calif., and a new folding carton plant in Seattle.

Crown Zellerbach Corp. has appointed **Leo Jacobs** eastern div. sales manager for distributor sales.

Diamond Alkali Co., Cleveland, has named Dr. Alfred Hirsch to new position of research scientist.

Durethene Corp. has elected Carl A. Raabe president and director.

Fruehauf Trailer Co., Detroit, has elected Thomas Nichols, president of **Olin Mathieson Chem. Corp.,** a director.

Lincoln Container Corp., Lincoln, Ill., and **Obear-Nester Glass Co.,** St. Louis, have elected Maxwell Jones president and treasurer.

Marathon Corp. has purchased **Manchester Paper Boxes, Ltd.,** Toronto, but **Michigan Carton Co.** voted against sale of its assets to **Marathon.**

Norda, essential oil producer, has purchased all American assets of **Heine & Co.,** which will be located in New York City.

Packaging Institute has elected H. T. Holbrook, v.-p. of **Standard Packaging Corp.,** president.

Package Products Co., Inc., Charlotte, N. C., has acquired **Herald Press, Inc.** through exchange of stocks.

Portco Corp., Vancouver, Wash., will add new products to its paper and plastic div. as a result of new construction and acquisition of **Central States Paper & Bag Co.'s** operation at Auburn, Wash.

Riegel Paper Corp. has elected John L. Riegel president.

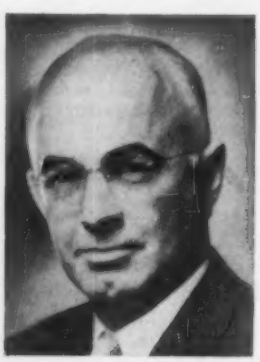
Deaths

David Everest, 72, chairman of the board of Marathon Corp.—Oct. 28.

George Holm, 69, retired research biochemist of USDA—Nov. 11.

Roberto Melendez, 56, overseas advisor for Dairy Industries Society International.—Oct. 30.

Henry Werner, 80, former president and general manager of H-O Cereal Co., Inc., Buffalo, N. Y.—Oct. 24.



H. J. Everts, (left) former treasurer of Consolidated Foods Corp., has been named a director and vice-president of the firm. **Stacey H. Gifford** (right), secretary and counsel since 1953, was also named v.-p.

Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
—Free For The Asking—

PLANT ENGINEERING

Fire Control Dome

Extensive information, diagrams and details show operation of a fusible-link roof dome said to provide gas venting in event of a fire. Plastic construction gives further service as a skylight. Sizes and applications detailed. 6 p.—*Roscoe Products, Inc., Cambridge, Mass. (207A)*

Pinch-Type Valves

Full facts on a line of flexible, pinch-type valves show handwheel yoke and rubberized-fabric body construction. Unit is applicable in handling corrosive and thick slurries. Other advantages are detailed. Catalog FL 382R, 26 p.—*Ferris Flexible Valve Corp., Palisades Park, N. J. (207B)*

Plastic Line

Bulletin describes construction of a plastic processing line. Components include pipe, fittings, and valves used to handle acids, oils, and juices. Sizes and specifications are listed. Bulletin 80-A, 7 p.—*American Hard Rubber Co., New York City. (207C)*

Lubricated Plug Valve

Concerns line of iron and steel lubricated plug valves. Illustrations depict single and screwed-and-bolted flange-type valves. Sectional and detailed drawings are included with physical data on dimensions and ratings. Catalog PV-4, 34 p.—*Wm. Powell Co., Cincinnati. (207D)*

Motorized Drive Manual

Informative booklet details applications of a number of theoretical and practical rules for solving electric motor drive problems. Motorization Bulletin, 16 p.—*A.C.E.C. Electric Corp., New York City. (207E)*

Controlled Volume Pumps

Diagrams and pictures illustrate operation of latest unit in a line of controlled volume pumps. Application features and specifications are discussed. Diagram illustrates major components. Bulletin 955, 4 p.—*Milton Roy Co., Philadelphia. (207F)*

Aluminum Bus Way

Considers construction and advantages of an aluminum, electrical distribution system. Rating chart, diagrams, and other graphic data illustrate bus way specifications. Bulletin GEA-6169, 8 p. *General Electric Co., Plainville, Conn. (207G)*

Heat Transfer Fluid

Bulletin treats of using polyalkaline-glycol derivative for heat transfer. Fluid is said to be unusually resistant to sludge formation. It is non-corrosive to copper and other common metals of construction. Form 7490, 4 p.—*Carbide & Carbon Chemicals Co., New York City. (207H)*

Piping Insulation

Bulletin tells of a glass foam insulation used on piping and equipment. Physical properties, sizes, and available shapes are given. Recommended thicknesses are detailed for temperatures ranging from —50 to 800 deg. F. 8 p.—*Pittsburgh Corning Corp., Pittsburgh. (207I)*

Magnetic Trap

Concerns two magnetic pipeline traps used to reduce damages to filters, mixers and pumps. One model designed with sanitary features—the other is a low-cost unit for use where conditions are not severe. Complete specification table included. Models range from ½ to 4 in. in size. Bulletin B-605, 4 p.— *Eriez Mfg. Co., Erie, Pa. (207J)*

Electric Brakes, Clutches

Application report lists numerous ways in which electric brakes and clutches can be applied to power transmission drives. No food industry examples, but general principles seen applicable.—*Warner Electric Brake and Clutch Co., Beloit, Wis. (207K)*

Steel Data Sheet

Relationship between hardness and tensile strength of carbon and alloy steels is graphed on a technical data card. Testing systems covered are Brinell, Monotron, Vickers, and Rockwell. Technical Data Card 183, 2p.—*Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa. (207L)*

Cork Products

Discusses various properties of natural and composition cork. Also, depicts available forms. Bulletin S-56, 4p.—*Dodge Cork Co., Inc., Lancaster, Pa. (207M)*

Gear Couplings

Illustrative bulletin gives construction, installation, and selection data for a series of self-aligning gear couplings. 12p.—*Philadelphia Gear Works, Inc., Phila. (207N)*

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Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

Bulletin 54-TL—Trucks for Use with Overhead or Under-Floor Powered Conveyors.

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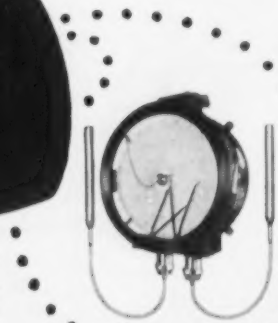
3. **ACCURATE CALIBRATION** — conservatively, within 1% of scale range.
4. **LONG LIFE** — thick-walled capillaries . . . seamless tubing.
5. **LOW INITIAL COST** . . . low upkeep — few moving parts — no need for compensators.



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Multi-Purpose Pumps

Shows a bronze positive-displacement pump said to give versatile, flexible, dependable, and economical operation in a wide range of uses. 2p.—*Eco Engineering Co., Newark, N. J. (208A)*

Motor Line

Colorful bulletin uses large photos to illustrate features of a line of ½ to 40 hp. open and closed motors. Bulletin N-100, 16p.—*Howell Electric Motors Co., Howell, Mich. (208B)*

Hydraulic Tube Fittings

Full series of dimensioned drawings illustrates specifications for a line of straight-thread hydraulic tube fittings. Catalog 4301, 20p.—*Parker Appliance Co., Tube & Hose Fittings Div., Cleveland. (208C)*

Glass-Fiber Insulation

Step-by-step photos show installation of special glass-fiber metal building insulation. States product eliminates adhesive problem and reduces application time by 50%. 4p. — *Owens-Corning Fiberglass Corp., Toledo, Ohio. (208D)*

Inplant Chlorinator

Series of pictures and colored drawings give full facts on design, operation, and capacity of a chlorinator capable of purifying plant water supplies, treating sewage and industrial waste, and controlling slime. Catalog 70-10, 16p.—*Fischer & Porter Co., Hatboro, Pa. (208E)*

Piping Expansion

Technical manual considers data required for piping-flexibility and expansion measurements. Presents tables and charts for these calculations, and lists code rules. File 4.03, 28p.—*Tube Turns, Louisville, Ky. (208F)*

Can Making Machinery

Catalog presents line of flanging, beading, and seam rolling machinery for medium and high-speed can making lines. Catalog 36B, Section 4, 20p.—*E. W. Bliss Co., New York City. (208G)*

Modular Plastic Tank

Considers unique plastic tank sections that can be joined together to give an infinite variety of tank sizes and shapes. 4p.—*Copolymer Corp., Los Angeles. (208H)*

Thermal Liquid Vaporizers

Treats of principles and layout for a forced recirculation, vaporizing boiler utilizing a thermal liquid as heating element. Unit operates safely up to 750 F. 6p.—*International Boiler Works Co., East Stroudsburg, Pa. (208I)*

Blower Line

Presents a line of axial flow, positive displacement blowers that act through operation of intermeshing male and female rotors. Units are made for pressure and vacuum service in a range of 1000 to 5800 cfm. Bulletin B-154, 4 p. —*Read Standard Corp., New York City. (208J)*

MAINTENANCE

Fire, Slip-Proof Paints

Two bulletins give application instructions, colors, and advantages for a line of skid-proof and fire-resistant paints. — *Kelley-Mahorney Co., Louisville, Ky. (208K)*

Stainless Brazing Paste

Describes a new brazing alloy, available in paste form, used to join heat- and corrosion-resistant alloys by torch, and induction brazing tools. Full product data given. 3p.—*Wall Colmonoy Corp., Detroit. (208L)*

Self-Locking Nuts

Fact sheet gives highlights of a segmented lock nut that holds securely at any desired position on the bolt. 1p.—*Standard Pressed Steel Co., Jenkintown, Pa. (208M)*

Test Instrument Line

Catalog illustrates and describes complete line of equipment for testing industrial electronic systems. Catalog R-36-A, 15p.—*Weston Electrical Instrument Corp., Newark, N. J. (208N)*

Tips On Boiler Corrosion

Bulletin gives handy tips on eleven ways to prevent boiler tube corrosion. Bulletin TR-537, 8p.—*Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa. (208O)*

Cleaning Products

Pamphlet lists series of cleaning products with their application in washroom sanitation. 4p.—*U. S. Sanitary Specialties Corp., Chicago. (208P)*

Wood Flooring Tips

Poster-type sheet depicts common wood flooring problems and their solution.—*National Sanitary Supply Association, Chicago. (208Q)*

Caster Selection

Detailed catalog tells how to select casters to meet different equipment problems. Specifies and illustrates wide line of wheels. 28p. —*Rapids-Standard Co., Inc., Grand Rapids, Mich. (208R)*

Engine Lubrication

Educational booklet considers role of lubricating oil in modern piston engines, and details tips on proper use of oil to cut wear. Booklet 10, 12p.—*Texas Co., New York City. (208S)*

New Welding Gloves

Leaflet presents a new-type welding glove containing aluminum foil to keep hands cool. Table lists patterns and prices. 1p.—*Olympic Glove Co., Inc., New York City. (209A)*

Plastic Product

Displays available forms of the plastic Agilene, and shows equipment necessary for welding and spraying the material. 8p.—*American Agile Corp., Maple Heights, Ohio. (209B)*

V-Belt Selection Tables

Extensive booklet carries selection tables for picking proper V-belt drives. Also gives information on basic drive principles, technical data on sheaves, and other operating hints. Booklet 20T40, 74p.—*Allis-Chalmers Mfg. Co., Milwaukee. (209C)*

Magnetic Pulley Line

Detailed bulletin tells full story on line of electro-magnetic pulleys. Cutaway drawing shows construction details. Charts give dimensions, weights, and other pertinent data. Bulletin 303C, 16 p.—*Sterns Magnetic Inc., Milwaukee. (209D)*

Concrete Floor Repair

Pictures steps in application of a premixed mortar to repair cracked and broken cement floors. 2p.—*Master Builders Co., Cleveland. (209E)*

Caster Wheel Line

Bulletin tables facts on wide line of light, medium, and heavy duty swivel and rigid caster wheels. Models available with single, and double race ball bearings. 8p.—*Fairbanks Co., New York City. (209F)*

MATERIALS HANDLING

New Electric Fork Truck

Pictures and diagrams spell out story of a new, walking-type electric fork truck said to feature short overall length. Circular 34C, 4p.—*Lewis-Sheppard Products, Inc., Watertown, Mass. (209G)*

Nylon Conveyor

Highlights advantages of a Nylon, flat-top conveyor chain for moving product containers. Properties and specifications fully covered. 4p.—*Fenco, Inc., Chicago. (209H)*

Roller Chains

Stock and special attachments for a variety of roller chains pictured and detailed. Brochure gives hints on possible applications to different conveying systems. Bulletin 55-11, 4p.—*Chain Belt Co., Milwaukee. (209I)*

Conveyor Facts

Concerns application data and specifications for gravity roller, wheel, belt, and live-load conveyors. Component parts are listed and pictured. 20 p.—*Lamson Corp., Syracuse, N. Y. (209J)*

Conveyor Belt Line

Treats of a line of flange, cleated, and flighted conveyor belts constructed of heavy duck belting and rubber. Also suggests idlers for use on these units. 9 p.—*Dura-Belting Mfg. Co., Inc., Oakland, Calif. (209K)*

Overhead Monorail

Shows series of installation photos that depict advantages of a monorail overhead conveyor. Booklet 2008-L, 12p.—*Cleveland Crane & Engineering Co., Tramrail Div., Wickliffe, Ohio. (209L)*

Compact Lift Truck

Considers advantages of a 4,000-lb.-capacity, straddle-type lift truck designed for narrow aisle operations. Full specifications listed. Bulletin 831, 2p.—*Raymond Corp., Greene, N. Y. (209M)*

Multi-Use Belt Table

Contains all facts on a self-powered conveyor table suitable for inspection, packaging, and assembly operations. 5p.—*Conveyor Specialty Co., Inc., North Quincy, Mass. (209N)*

New Fork Trucks

Company magazine shows operation and advantages of a new electric truck equipped with hydraulic fork that extends and retracts when picking up and depositing a load. Unique feature is said to cut operating space. Lever, 16 p.—*Lewis-Shepard Products, Inc., Watertown, Mass. (209O)*

Roller Conveyor Line

Shows available pieces and construction of a line of roller conveyor parts. Key product features shown. Bulletin GP, 6p.—*Alvey-Ferguson Co., Cincinnati. (209P)*

PROCESSING

Vinegar Generator

Gives details of compact new vinegar generator that acts without use of packing materials. Table gives pertinent size and operating data. 4p.—*Engineer Design Co., New York City. (209Q)*

Sliced-Pickle Separator

Concerns efficiency of a vibrating separator for sliced pickles. Unit acts to eliminate broken and end pieces from production flow. 4p.—*Stevens-Adamson Mfg. Co., Aurora, Ill. (209R)*

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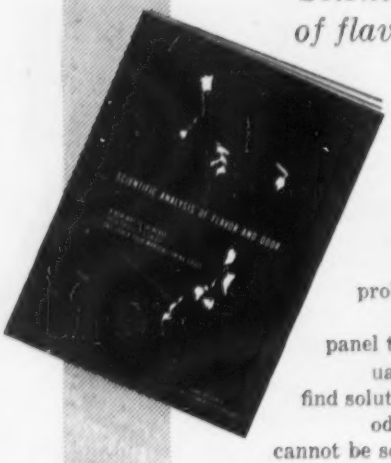

It may suggest answers to *your* flavor and odor problems. Read how Evans sensory panel technique of evaluation can help you find solutions to flavor and odor problems that cannot be solved by chemical analysis — or any other method of testing.

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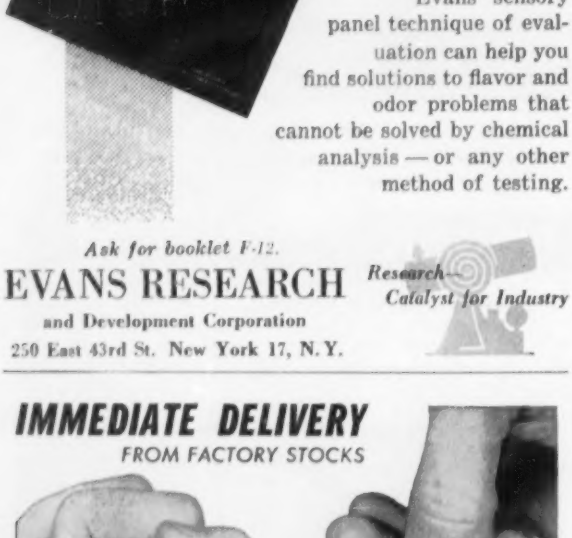

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High Density Concentrator

Considers operation and accomplishments of a new evaporator that is said to give high density concentration of heat-sensitive liquids. Bulletin 369, 4 p.—*Blaw Knox Co., Buflovak Equipment Div., Buffalo. (210A)*

Film Type Evaporator

Series of data sheets give comprehensive details on construction, operation and installation of a film-type evaporator. Unit features one-pass, continuous concentration of heat sensitive and viscose products. Bulletin 33, 11p.—*Rodney Hunt Machine Co., Orange, Mass. (210B)*

Rotary Driers

Covers applications and features of a series of rotary driers. Food plant uses cited. Catalogue 549, 12p.—*Standard Steel Corporation, Los Angeles. (210C)*

Pickle Cutters

Gives full data on pickle slicing, quartering, halving, and dicing machines. Illustrations show units and price list is included. 16p.—*Urschel Laboratories, Inc., Valparaiso, Ind. (210D)*

Baking Equipment Line

Pictures and gives capacities for a wide line of baking equipment, ranging from pneumatic and mechanical materials-handling machines, to mixers, ovens and panning equipment. 27p., Bulletin 55764 — *Read Standard Corp., York, Pa. (210E)*

Fruit Dumping-Sorting Table

Leaflet illustrates action of a box-dumping device for emptying fruit on sorting table. Grading table features also shown. 2p.—*Northwest Equipment Co., Yakima, Wash. (210F)*

Pressure Leaf Filters

Concerns selection data and specifications for a line of 64 pressure-leaf filters, detailed according to leaf spacing. Catalogue HVP-55, 7. p.—*American Plant Equipment Co., Elizabeth, N. J. (210G)*

Walk-In Coolers

Construction details and advantages given for a series of plywood walk-in coolers. Installation photos are included. 4p. — *Annapolis Yacht Yard, Inc., Freezer Box Div., Annapolis, Md. (210H)*

Doughnut Lines

Folder illustrates component parts of a complete doughnut production line. Specifications and features are detailed. 8p.—*Doughnut Corp. of America, New York City. (210I)*

Mixer Series

Pictures and describes line of food mixers and gives pertinent selection data. 2p.—*Triumph Mfg. Co., Cincinnati. (210J)*

Baked Goods Proofer

Shows panel construction, ducting, and air conditioning system featured by automatic baked goods proofing unit. 2p.—*Union Steel Products Co., Albion, Mich. (210K)*

Leaf Filters for Beer

Bulletin discusses applications of pressure leaf-type filters in brewing. Many photos show typical installations. Bulletin NB-5-54, 8p.—*American Machine and Metals, Inc., Niagara Filters Div., East Moline, Ill. (210L)*

INSTRUMENTS

Indicating Flow Meter

Literature illustrates use of direct-flow principle to prevent scale and sludge accumulation in an indicating flow meter. Magnetic coupling eliminates glands and bearings. 2p.—*Scully-Jones & Co., Chicago. (210M)*

Time-Delay Relay

Lists selection information for a series of relays designed to produce time delays in electrical circuits. Method of operation is given. Bulletin SD-1, 4p.—*Elastic Stop Nut Corp. of America, Elizabeth, N. J. (210N)*

Electro-Pneumatic Controller

Brochure considers uses of a control that combines the efficiency of pneumatic valve operation with flexibility and fast response of an electrical system. Photographs and line drawings illustrate all pertinent details. Folder ND4(8), 8 p.—*Leeds & Northrup Co., Philadelphia. (210O)*

Differential Expansion Units

Concerns features of a series of temperature control instruments (differential expansion type) for temperatures up to 1800 deg. F. Units can be used in electric or pneumatic systems to serve as safety alarms and cut-outs. Catalogue G-20, 4p.—*Burling Instrument Co., Chatham, N. J. (210P)*

Control Components

Comprehensive catalogue considers wide line of pressure controls, power positioners, relays, thermostats, signal transmitters, control valves, and motorload regulators. Other electronic and mechanical devices included. Bulletin GST-901, 24p.—*Hagan Corp., Pittsburgh. (210Q)*

Tubing Supports

Catalog considers a variety of tubing support channels, component parts, and special devices for mounting instrument tubing. Bulletin 955-D, 16p.—*P-W Industries, Inc., Philadelphia. (210R)*

In-plant TV

Tells of a closed circuit television system for control of various plant operations. Circuit has operating range of 500 ft., which can be increased through use of boosters. Bulletin 508, 4p.—*Taller & Cooper Inc., Brooklyn, N. Y. (211A)*

Feeder Instrumentation

Covers application of instrumentation principles to liquid and dry feeders. Gives basic control facts with illustrations. Preprint B-I-F-M65, 8p.—*Omega Machine Co., Providence, R. I. (211B)*

Automatic Controllers

Fold out sheet shows wide line of automatic controls, gages, recorders, and other robot equipment. Bulletin DMO41.—*Bristol Co., Waterbury, Conn. (211C)*

Automatic Check Weigher

Tells of a new continuous automatic check weigher, comprising a suspended conveyor and scaling unit. Rolling items are automatically counted and weighed, results print on dual tapes. Catalog 21, 2p.—*Weighing Components, Inc., Hatboro, Pa. (211D)*

Easy Reading Gages

Concerns a line of compact receivers, and draft, pressure, and temperature gages. Units feature large, easy-reading scales, contained in a case that can be single- or group-mounted. Bulletin 806, 12p.—*Republic Flow Meters Co., Chicago. (211E)*

Instrument Index

Publications on research, teaching, testing, industrial, heat treating, and power plant instruments and control systems are listed in new instrument index. Booklet ENT (1) 26 p.—*Leeds & Northrup Co., Philadelphia. (211F)*

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Electronic Relay

Shows construction and circuit diagram for a high-speed, sensitive, electronic relay device. Bulletin 214F, 2 p.—*Automatic Switch Co., Orange, N. J. (211G)*

Regulator Index

Gives list of catalogs, bulletins, and data sheets covering regulator instruments. Index is broken down into industries, products, and subjects covered.—*Minneapolis-Honeywell Regulator Co., Philadelphia. (211H)*

PACKAGING

Wire Bag-Closer

Concerns advantages of a compact machine that serves to close film-packed bags by applying a small metal ring. Unit eliminates slow hand-tying methods. 4p.—*Esko, Inc., Minneapolis. (211I)*

Lettuce Wrapper

Sums up advantages for a compact, automatic lettuce wrapper that handles from 30 to 65 heads per min. 4p.—*Wrap-King Corp., Holyoke, Mass. (211J)*

Prepackaging Line

Concerns conveying, weighing and bagging machines that form an automatic prepackaging line for raw produce. 4p.—*Trescott Co., Inc., Fairport, N. Y. (211K)*

Heat-Sealing Unit

Gives details of a controlled heat-sealing unit available in 1 to 24 ft. lengths. Specifications detailed and heat, pressure, and sealing time considered. 4p.—*Packaging Industries, Montclair, N. J. (211L)*

Carton Strapper

Action photos show operation of a line-installed carton strapper for steel-strap shipping protection. Operating facts are given, strap specifications tabled. 4p.—*Acme Steel Products Co., Chicago. (211M)*

Semi-Automatic Packager

Illustrates basic packaging machine and feeder-accessories for handling candies, nuts and other irregular-shaped objects. Unit handles film packages up to 5 in. wide, 6 in. long. 4p.—*Pak-Rapid, Inc., Philadelphia. (211N)*

Compact Case Coder

Complete specifications and advantages given for a roller-type conveyor-installed, case coder and imprinting device. 4p.—*Adolf Gottscho, Inc., Hillside, N. J. (211O)*

Bag Closing Machine

Depicts automatic machine that closes prepackaged produce bags with wire. Models accommodate from 2 to 100 lb. units, feed and discharge conveyors may be tilted for flexibility. 4p.—*Hamer Machine Co., Minneapolis. (211P)*

Wrapper Line

Concerns series of wrapping machines for handling simple or diffi-

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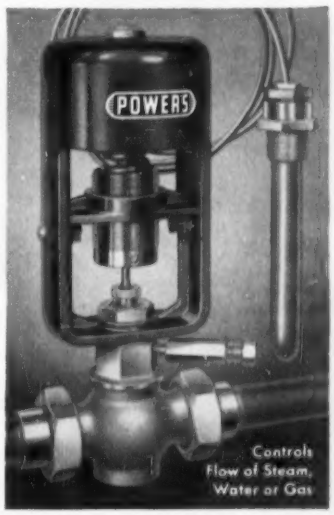

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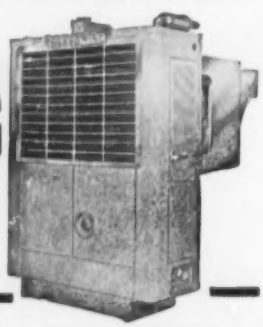

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cult packaging problems. Unit will accommodate a wide variety of wrapping materials and accommodate different-sized packages. 6p.—*Wrap-King Corp., Holyoke, Mass. (211Q)*

Packaging Check List

Comprises packaging engineer's check list for selection of proper flexible package material. Folder consists of 21 questions on product characteristics. Answers are given in terms of protective factors a packaging material must possess to resolve the problem. 4 p.—*Riegel Paper Corp., New York City. (212A)*

Plastic Container Liner

Describes construction features and uses of a polyethylene liner for steel containers. Material is said to be very durable and to give product and leakage protection. 2 p.—*Jones & Laughlin Steel Corp., New York City. (212B)*

Wrapping Machine Line

Colorful catalog considers features of a wrapping machine, able to handle a variety of different shaped products. 18 p.—*Hudson-Sharp Machine Co., Green Bay, Wis. (212C)*

Corrugated Carton

Handy folder gives prices on over 150 different-sized corrugated cartons. Also listed are new and slightly used job lot cartons and heavy-duty-test boxes.—*Washington Box & Paper Co., Inc., Brooklyn, N. Y. (212D)*

Aluminum Foil Uses

Booklet presents facts on the color printing of aluminum foil. Samples are included and information contained will give processors ideas for labeling and advertising layouts.—*Reynolds Metals Co., Louisville, Ky. (212E)*

QUALITY CONTROL

Pilot Spray-Dryer

Treats of laboratory-sized conical spray dryer, having an air rate of 250 cfm, which ensures a product flow of 15-lb. per min. at low temperatures. Other facts and advantages presented. 4p.—*Bowen Engineering, Inc., North Branch, N. J. (212F)*

Pickle Testing Kit

Describes compact new kit for testing acid and salt content of pickle brine by means of titration. Test procedure and color standard available free.—*Morton Salt Co., Chicago. (212G)*

Lab Freeze-Dryer

Features compact, small-scale freeze drying device for laboratory use that operates at flip of a switch. Seen useful in preserving biological materials. 2p.—*Naresco Equipment Corp., Newton Highlands, Mass. (212H)*

Furnace, Distintegrator

Full data on a line of microcombustion furnaces for carbon, hydrogen, nitrogen, and oxygen analyses. Also, information concerning electromagnetic apparatus for fast crushing or mixing of bacteria and tissue cultures. 4 p. —*C. A. Brinkmann & Co., Great Neck, L. I. (212I)*

Dual Analyzer

Depicts a new, double-acting unit which can be used for both colorimetric measurement and spectrophotometry. Compact machine is said to have a low maintenance cost and high efficiency. 6 p.—*Bausch & Lomb Optical Co., Rochester, N. Y. (212J)*

Icing Handbook

Handy indexed handbook shows how to determine specific gravities of icings and fillings, lists chocolate and cocoa conversion tables, and presents weight-per-gallon of various liquids. 24p.—*Basic Foods Sales Corp., Englewood, N. J. (212K)*

Research Equipment Line

All facts given for a series of low-temperature cabinets, timers, needle valves, stainless steel ware, and other general pieces of research equipment. Apparatus digest 3, 16p.—*A. Daigger & Co., Chicago. (212L)*

INGREDIENTS

Flavor Agent

Comprehensive data sheets study properties and possible uses of Paletone—a highly purified, aromatic chemical. 28p.—*Dow Chemical Co., Midland, Mich. (212M)*

Oils, Colors, & Concentrates

Wholesale catalog, limited to those who buy in wholesale quantities, lists and prices wide line of concentrates, essential oils, colors, and fixatives for the food industry. 12 p.—*Fritzsche Brothers, Inc., New York City. (212N)*

Water-Soluble Spices

Catalog lists line of water-soluble spice oil flavorings for use in high water-content foods, such as pickles, condiments, and sauces. Also gives formulas for different products. *Spiceolate Flavors*, 18 p. —*Dodge & Olcott, Inc., New York City. (212O)*

Flavor Price List

Essential oils, concentrates, colors, balsams, and similar products are listed in this Fall Price List. 12p.—*Fritzsche Bros., Inc., New York City. (212P)*

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How these big producers profit with Pfaudler Piston Fillers

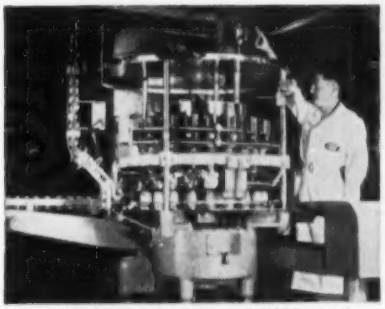
These companies are successfully processing everything from semi-frozen juices to potted meats. They fill tin, glass or composition containers in a variety of shapes and sizes. All use Pfaudler Rotary Piston Fillers. All get fast, accurate filling.

For example, H. J. Heinz gets a breathless 800 cans per minute (has run 1050!) filling baby food with a Model RP-35. Production rates are correspondingly high with 7-, 14- or 21-station Pfaudler Fillers. Even gallon containers can be filled at 100 per minute, using the 7-station RP-7.

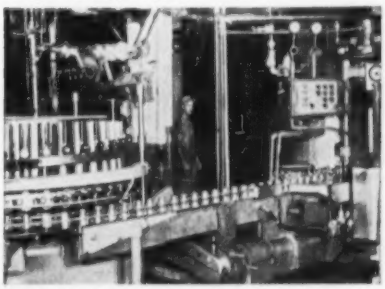
Mechanical efficiency is a profit factor, too. Pfaudler Fillers are accurate to within ±1/10 oz. No-can-no-fill device prevents waste, keeps machine and containers clean. Model RP-35, equipped with an electric brake, stops rotation within 2/10 of a second.

Because spillage is avoided, cleaning is less of a chore. Valves and pistons slide out easily for fast cleaning and visual inspection. One man can do the whole job in 30 minutes. He needs no tools either.

The speed and efficiency of Pfaudler Rotary Piston Fillers have been proved and tested in nearly 10 years of operation by leading names in the food industry. You, too, may profit from the speed, low maintenance and low operating cost of Pfaudler Fillers. Complete data on models and speeds is in Bulletin 911. Send for it today.

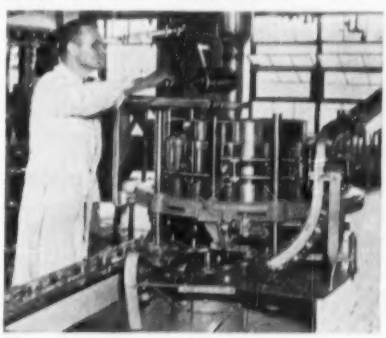


Minute Maid Corporation fills up to 600 containers per minute with Pfaudler 21-station Fillers. 1/10 of an oz. accuracy keeps costs low.



H. J. Heinz Co., at Leamington, Ontario, Canada, fills more than 800 cans of baby food per minute with 35-station Pfaudler Filler, world's fastest.

Hershey Chocolate Corp., Hershey, Pa., fills 300 five-oz. cans of chocolate syrup per minute on each of several Pfaudler 14-station Fillers.



Kingan & Co., Indianapolis, Ind., uses 14-station filler for potted meats. Machine is rated at 150 to 400 cans per minute.

THE PFAUDLER CO., Dept. FE-12, Rochester 3, N. Y.

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A slum reaches across blocks, across miles, to sit on your doorstep and demand a price.

You pay it in the threat of crime and juvenile delinquency to your family. You pay the price in higher personal property taxes to fight the disease and crime and poverty that are slum-bred. You pay personally when the value of your home sinks as community deterioration takes another step closer.

Your *firm* pays when the community where you do business goes downhill. Slums automatically mean lower purchasing power and less effective labor.

Good citizenship is good business

It's good citizenship and good business both for your firm to join efforts to check housing decay . . . to stop slums before they start. In fact, it's the *responsibility* of every business, as it is of every other good citizen, to support community improvement efforts.

Some slums are beyond repair. They should be torn down and a fresh start made. Others can be remodeled, made to conform to better living standards. So it is up to you to get behind every sound program which seeks to provide adequate housing for all our people.

Adding your support to the efforts of the millions already attacking the problem, your firm can help stop slums cold and put America's housing standards at a new height.

How to get into action

A group of Americans from every walk of life has formed a new, non-profit organization to help combat home and community deterioration – The American Council To Improve Our Neighborhoods . . . A.C.T.I.O.N.

Send for a free copy of "ACTION." It explains what A.C.T.I.O.N. is and proposes to do. It also lists booklets, research reports, check-lists, and other material which can help you protect the housing health of your community. Address P. O. Box 500, Radio City Station, New York 20, N. Y.

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2865 W. Franklin St. Baltimore 23, Md.
440 W. 24th St. New York, N. Y.

LEWIN ASSOCIATES
Industrial Consultants
DAVID N. LEWIN, Ph.D., FOOD CONSULTANT
JOSEPH D. LEWIN, CONSULTING ENGINEER
Design — Layouts — Investigations — Consultation — Reports — Market Investigations — Bakeries, Dairy Products—Food Preserving by Heat, Drying, Freezing—Consultation in Managing, Warehousing, Distribution — Formulae, New Products.
243 West 56 St. N. Y. 19, N. Y. JUdson 6-1749

GUSTAVE T. REICH & ASSOCIATES
Consultant to the Food Industries.
COMPLETE CONTINUOUS PROCESSES.
Operation — Waste Disposal
AUTOMATION
1422 Chestnut St. Philadelphia 2, Pa.

Now,

more than ever before,

the food industry should take advantage of the opportunity to use the broad experience and knowledge of the consultant and profit by such use.

SCHWARZ LABORATORIES Inc.
Consultation on Food Problems
Analyses of Foods and Beverages
Food Plant Design and Process Improvement
Research and Investigations
Legal Testimony
Write for bulletin describing facilities and services
230 Washington St., Mount Vernon, N. Y.

FOSTER D. SNELL
Research Laboratories
SENSORY PANEL TESTS
Food Analysis, Stability Studies, Evaluations, Packaging Problems, Vitamin Assays.
Write For "Food Facts"
29 W. 15th St., N. Y. 11 Watkins 4-3500

STRASBURGER & SIEGEL
Chemists—Bacteriologists—Food Technologists
Specialists in Canned and Glassed Foods
Laboratory Services
Testing Tomato Products, Mayonnaise, Pickles, Oils, Fats, Beverages, Sugars, Filth in Foods, Food and Drug Libels, Expert Testimony
1403 Eutaw Place Baltimore 17, Maryland

WALTHAM LABORATORIES, INC.
LABORATORY SERVICES: Food analysis, extraneous matter, bacteriological tests. Water
FOOD PLANT SANITATION — INSPECTION & SAMPLING
817 Moody Street Waltham 54, Mass.

WISCONSIN ALUMNI RESEARCH FOUNDATION
Project Research, Consultation, and Production Control Services in
Biochemistry, Chemistry
Bacteriology, Pharmacology,
and Insecticide Testing and Screening
Write for Price Schedule
P. O. Box 2059 P Madison, Wisconsin

the advertisements on the following pages

are live opportunities in the field of food processing and distribution.

Each announcement represents a current Want or Offering of an organization or individual in the field, with some element of profit in each for whoever can fill the need. Some have money-saving possibilities, others are opportunities for more business; many are employment opportunities; still others offer property, or equipment—used or surplus new equipment.

"Searchlight" advertisements are constantly changing. New opportunities are constantly finding their way into this great Want medium, each issue. Regular reading of the "Searchlight" pages can be as important to you as reading the editorial sections; Editorial matter is NEWS OF OPPORTUNITIES offered in the industry.

for EVERY business WANT
"Think SEARCHLIGHT first"

Where To Buy

Ingredients
For the Food Processor

SPECIAL MACHINERY . . .
. . . DESIGNED AND BUILT

We can help you increase production by:
Designing attachments to your present machines.
Modernizing your present machines.
Designing new machines to make your product.

We have the know how and the experience.

CUSTOM MACHINE COMPANY
95 Summit Ave. Summit, N. J.
Crestview 3-2532

Your inquiry will have special value . . .
If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but more important, it will identify you as one of the men the advertiser wants to reach with his message & help to make possible enlarged future service.

CARROT OIL
makes food
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!

HUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work

Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered

Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

—RATES—

UNDISPLAYED

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y. for January issue closing December 27th.

Fast Growing, Nationally Established, Upper Midwest FOOD PROCESSOR has openings for the following:

MASTER MECHANIC — Newly created position with complete responsibility for Mechanical Equipment Selection, Development and Maintenance.

FOOD TECHNOLOGISTS — B.S. Degree or equivalent in experience required. Position covers all phases of Product Development and Process Control.

PRODUCTION SUPERVISOR — Requires varied experience in Prepared Food Processing. Opportunity for advancement.

Benefits and Top Salaries commensurate with experience. Replies strictly confidential. Please write to

P-8504, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

FOOD PLANT ENGINEER

WANTED

Graduate mechanical, electrical, or civil engineer by large frozen foods company.

Experience in canned or frozen foods desirable and refrigeration experience or background a great asset.

Assignment will be as district engineer in charge of several plants under general office chief engineer. Work requires interests in food processing, initiative, imagination, and self-reliance.

Company has excellent insurance and profit sharing bonus program.

Send complete resume and experience record with first letter.

Interviews will be arranged for at our expense.

P-8435, Food Engineering
68 Post Street, San Francisco, Calif.

PRODUCTION ASSISTANT

Opportunity for young man with Engineering Degree preferred but not essential for production assistant to Milling Superintendent in large midwest Corn Mill.

P-8237, Food Engineering
520 No. Michigan Ave., Chicago 11, Ill.

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1111 Wilshire Blvd. (17)

POSITIONS VACANT

Engineer Draftsman capable of designing can handling equipment and making can handling system layouts. Salary commensurate with abilities. Reply with hand printed letter and representative sample of drawing ability. All replies confidential. P-7902, Food Engineering.

Wanted—Maintenance Superintendent. Excellent opportunity in expanding New York State plant freezing vegetables. Give age, experience and approximate salary expected. P-8291, Food Engineering.

SELLING OPPORTUNITY OFFERED

Wanted . . . Manufacturers Representatives calling on meat packers and other food processing plants to represent Weber Hydraulic Frozen Meat Cutters and Slicers. The finest equipment made for this fast growing field. Commission basis. Old established manufacturer. Write us about your background, lines handled, territory covered. H. G. Weber & Company, Kiel, Wisconsin.

FOR RATES OR INFORMATION

About Classified Advertising

Contact The McGraw-Hill Office Nearest you

ATLANTA, 3
1321 Rhodes-Haverty Bldg.
WAlnut 5778
W. LANIER

BOSTON, 16
350 Park Square
HUbbard 2-7160
P. McPHERSON

CHICAGO, 11
520 No. Michigan Ave.
MOhawk 4-5800
H. BOZARTH
W. HIGGENS

CLEVELAND, 15
1510 Hanna Bldg.
SUperior 1-7000
C. J. LOUGHLIN

DALLAS, 2
Adolphus Tower
Main & Akard Sts.
J. CASH

DETROIT, 26
856 Penobscot Bldg.
WOodward 2-1793
L. SEEGAR

LOS ANGELES, 17
1111 Wilshire Blvd.
MAdison 6-4323
W. WOOLSTON

NEW YORK, 36
330 West 42 St.
LOngacre 4-3000
R. LAWLESS
W. SULLIVAN
D. COSTER

PHILADELPHIA, 3
17th & Sansom St.
RIttenhouse 6-0670
E. MINGLE
J. WILLIS

PITTSBURGH, 22
919 Oliver Bldg.
ATlantic 1-4707
C. J. LOUGHLIN

ST. LOUIS, 8
3615 Olive St.
JEfferson 5-4867
H. BOZARTH

SAN FRANCISCO, 4
68 Post St.
DOuglas 2-4600
E. WYCOFF

PERSONNEL MANAGERS

Looking for Engineers . . . Technicians?

Write for free copy of

"RESERVOIR or ENGINEERS and TECHNICAL MEN"

The engineers and technicians you want to reach are gathered in convenient, compact groups—as this 12-page booklet points out.

It keys the job titles these men hold to the McGraw-Hill publications they read for on-the-job information. It explains how you can make contact . . . channel, concentrate your employment advertising to just the men with the job qualifications you want . . . without wasting advertising money for higher-priced space in publications with general circulation, in which you pay for perhaps 999 unqualified readers for every 1 who may meet your job requirements.

Write for your free copy to
Classified Advertising Division
McGraw-Hill Publishing Co., Inc.
330 W. 42nd St., N. Y. 36, N. Y.

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

UNDISPLAYED RATE:

$1.50 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

PROPOSALS, $1.50 a line an insertion.

BOX NUMBERS count as one line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $13.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. for January issue closing December 27th.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

BUSINESS OPPORTUNITIES

Wanted: well rated food company desiring diversification of food products manufacturing by consulting food chemist 20 years experience with a successful food products manufacturing expansion plan of research and production. BO-8290, Food Engineering.

Large Modern Food Plant. Wants to manufacture and distribute additional food specialties in Metropolitan N. Y. BO-8386, Food Engineering.

For Sale—60,000 bushel cold storage—10,000 square feet floor space suitable for processing—heart of fruit belt. Bangor Fruit Exchange, Bangor, Michigan.

Small plant for sale, manufacturing fountain syrups and toppings, flavors, colors. Selling through jobbers. Located in Ohio. BO-8477, Food Engineering.

CANNING EQUIPMENT FOR SALE

3—Heekin No. 43 Can Seamers, Automatic, Max. Cap: 2-¾" Dia. x 7" High. Like New!

20—Like New Vertical Boilers, High Pressure, 15 HP, Oil Burners & Return Pumps

Also—MAGNETS, BOX STITCHERS, ROLLER CONVEYORS, PUMPS, SCALES, ELECTRIC MOTORS, MACHINE TOOLS

JOSEPH BEHR & SONS, INC.
Phone: 2-7721
1192 Seminary Street — Rockford, Illinois

FOR SALE
DeVilbiss Spray Machine
Now operating 4 spray heads, 15'6"x3'6", complete with pressure tank and conveyor.

FS-8550, Food Engineering
330 W. 42 St., New York 36, N. Y.
or call EV 1-2330, Brooklyn, N. Y.

Stainless TANK TRANSPORTS
Lightest Weight—Highest Strength—Best Insulation
All Capacities—Good Delivery for '56
Also Used Units—Sale or Lease
The BRODIX CORPORATION
217 South Ave. Fanwood, N. J.
Fanwood 2-5555

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

WANTED: *Your* IDLE EQUIPMENT

RIGHT NOW is the time to dispose of equipment you are not using. Somewhere, someone probably needs just the unit which is surplus with you. Why not turn it into cash before the end of 1955? Turn your liabilities into assets or TRADE your unneeded equipment for items you DO need. Look over the list below. FMC will buy or sell . . . serve you either way, promptly and satisfactorily.

Cappers
Centrifugals
Choppers
Clarifiers
Coating Pans
Colloid Mills
Columns
Conveyors
Cookers
Coolers
Cutters
Dicers
Dryers
Evaporators
Expellers
Fillers
Filters
Grinders
Hammer Mills
Heat Exchangers
Homogenizers
Juice Extractors
Kettles
Labelers

Complete Plants
Brewery — Distillery
Pectins
Cotton Seed Oil
Fruit Juices — Yeast
Vegetable — Fruit
Canning

Mixers
Ovens
Presses
Pulpers
Pulverizers
Reactors
Retorts
Screens
Sifters
Slicers
Sterilizers
Stills
Tanks
Vacuum Pans
Viscolizers

FMC FRED R. FIRSTENBERG, Pres.

FIRST MACHINERY CORP.
209-289 Tenth St., Brooklyn 15, N. Y. Phone: STerling 8-4672

ROTARY DRIER. Countercurrent, stainless steel, suitable food products, Drum 3' by 18'. Complete accessories including: drive, steam coils, blower, cyclone, feed metering device, conveyors, feed and product hoppers. New in 1952. Price $6000.—

BUFLOVAK DOUBLE-DRUM DRIER. 42" by 120". Complete, with Fitzpatrick Comminutor Model "M", stainless. Price $5000.—

BUFLOVAK EVAPORATOR, single-effect, stainless, sanitary, 196 sq. ft. Price $5000.—

YALE ELECTRIC FORK TRUCK Model M25TTF with battery and charger, used one year. Price $2500.—

YALE HAND LIFT TRUCK for pallets, Model J-20P. Price $300.—

MAPLE LEAF MILK CO.
Neenah, Wisconsin.
Phones: PA 2-4503 & PA 2-2363.

"DAY" #6 Double Arm Mixer; 100-8000# Mixers, all types; Bag fillers; 1000 gal. SS Tanks; Roller mills 5x12, 12x32, 16x40; 40HP motor; Complete liquid and powder filling-packaging lines, cheap.

I. E. NEWMAN
5602 Blackstone, Chicago 37, Ill.

FOR SALE

50 gal. S.S. Mixing Tanks.
60 gal. Groen S.S. Clad Jkt. Kettle.
100 to 300 gal. S.S. Mix Tanks, water jkt.
225 gal. Vert. S.S. Tanks, Insul.
250 gal. Vert. S.S. Tank, Insul., agit.
300 gal. Horiz. S.S. Tank, 3' x 7', agit.
650 gal. Horiz. S.S. Tank, 4' x 7'.
42" Buflovak S.S. Vacuum Pan.
60" S.S. Vacuum Pan with accessories.
60" Centrifugal Extractors, Type #316 s.s.
26" Centrifugal Extractors, 3 H.P.
125 to 1,500 gal. Homogenizers or Viscolizers.
3 H.P. Freon Compressor Unit.
3,000 gal. Glass Lined Tanks, Insulated.
3—#10BB Waukesha Pumps, 1 H.P.
55BB Waukesha Pumps, Variable Speed.
Hobart Grinder, 1½ H.P.
Plate Type Heat Exchanger, 135 S.S. Plates.
50 gal. S.S. Premixer (Tank), side agit.
3—475 gal. Vert. S.S. Tanks, 3'6" x 6'6".
10 H.P. Cyclotherm Boiler, Oil Fired.
15 H.P. O & S Powermaster Boiler, Oil Fired.
15 H.P. Titusville Boiler, Oil Fired.
Roots Connersville Blower, 2 H.P.
Milk Pasteurizers, Coolers, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

IN STOCK AT LOEB'S

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51. Sharples Vaportite, st. steel.
Collectors, dust: bag 5" dia. x 2½' to 5' long, steel.
Condensers: stainless steel and copper.
Conveyor, port. Rapid Standard, 16' lg.
Conveyor Tables: belts from 5½" wide x 12' long and up.
Cooker: 800 gal. horiz. s.s. st. jac.
Cutter, Bone: Wausau, 5 hp.
Cutters, silent: Buffalo 32" and 43".
Dicer: Sterling model EMIC-1/N2.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf. Devine 20 shelf.
Elevator: 18' c.c., 15x8x4" s.s buckets.
Extractor: Troy 26" monel basket.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson, Gump.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure — Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired 18" well.
Heater: 67 sq. ft., 1" s.s. tubes.
Homogenizer: 2-1200 GPH. Union, 300 GPH. Union, 125 and 400 Gph. Gaulin.
Kettles: Stainless steel 5 to 300 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto and semi-auto.
Mills, attrition: 30" 40 hp.
Colloid: Premier 3 hp. and 5 hp.
Hammer: Mikro, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Press: Dewatering Davenport 3A.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84". Roball 40 x 120" stainless steel. Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Tablet Presses: single punch and rotary.
Tanks: Glass lined, various sizes. Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Davenport rotary DRYERS: (1) 3½' dia., 18' long, stainless steel, with stainless steel lifting flights.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. **Chicago 22, Ill.**
Telephone: Seeley 8-1431 **Our 31st Year**

STOP Here's the Quality You Want

Buy With Confidence—"Consolidated"

Pneumatic Scale Packaging Unit. Double Drum Driers, from 24" x 36" to 42" x 120". Sperry 18" x 18" Plate and Frame Filter Presses, 3 #12 Sweetland Filters with 48 bronze monel covered leaves. Day #30 Jacketed Imp Mixer. Horizontal Dry Powder Mixers, Fillers, Cappers, Driers, Tanks, Kettles, etc.

Wanted: Your Idle Machines or Plants

Our 38th Year

CONSOLIDATED PRODUCTS COMPANY, INC.

56 Bloomfield St. Hoboken, N. J.
Tel.: HO 3-4425 N. Y. Tel.: BA 7-0600

January Specials

Premier 8" SS Colloid Mill, 30 HP mtr.
MRM S/S 12 Spout Rotary Vac. Filler.
Capem SIF Capper, Caps up to 88mm.
S/S Pasteurizer, 200 gal. Jkid. & Agtd.
Resina Capper, LC2, up to 80mm.
Phila. 2 piston S/S Filler, with motor.
Pneumatic Scale Labeler, serial 9894.
Standard-Knapp Wrap-around Labelers.
Ertel 15"x15" SS Filter Press New.
347 SS Tank, 10½'x21'8"x¾', 13,500 gals.
Lee 500 gal. 316 SS Still Complete Unit.

NEW—STEEL & S/ MIXERS KETTLES, TANKS & DRYERS
Fabricated to your Specifications
Engineering Advice Available

WE BUY COMPLETE PLANTS OR SINGLE UNITS
What Have You For Sale?
YOU CAN BANK ON

EQUIPMENT CLEARING HOUSE, INC.

111 33rd Street, Brooklyn, N. Y.
SOuth 8-4451 4452 8782

FOR SALE

1—Rogers 48" Stainless Steel Vacuum Pan
1—Buflovak #6.5 Stainless Steel Double Effect Evaporator—588 sq. ft.
1—Conkey Triple Effect Evaporator, Herculoy tubes—1900 sq. ft.—UNUSED
1—Goslin Birmingham Quadruple Effect Evaporator, copper tubes—6685 sq. ft.
1—Zaremba Double Effect Nickel Evaporator with 325 sq. ft. nickel tube steam chests
1—Bowen 5 dia. Stainless Steel Spray Dryer
1—Overton 24" x 60" Double Drum Dryer —UNUSED
1—Niagara #110-20 Stainless Steel Filter, 110 sq. ft.
4—Ammonia Compressors: York 12½ x 14½; York 11 x 13; Frick 9 x 9; Frick 8 x 8
2—Triangle G-2-C Elec-Tri-Pak Weighers and Fillers
2—14,000 gal. Horizontal Glass Lined welded Tanks, A. O. Smith
4—225 gal. Vertical St. St. Tanks with Side Agit.
1—10,500 gal. Horizontal Stainless Steel Tank. UNUSED
1—2500 gal. Glascote Horizontal St. St. Milk Storage Tank
1—2000 gal. Vertical Stainless Steel Tank. UNUSED
1—2000 gal. Vertical T347 Stainless Clad Jacketed Vacuum Receiver
25—Stainless Steel Tanks—30 gal. to 6500 gal.
25—Stainless Steel and Stainless Clad Steam Jacketed Kettles, 40 gal. to 500 gal.
2—Mojonnier Stainless Steel Vacuum Fillers, model 90
1—Hope type 18 Semi-Auto Single Piston Filler, St. St., Rising table, agitated hopper
2—Patt.-Kelley Twin Shell St. St. Blenders, 5 & 10 cu. ft.

BOTTLING CANNING PROCESSING — PERRY MACHINERY SUPPLIES

PERRY EQUIPMENT CORP.

1411 N. 6TH ST.
PHILA. 22, PA.
Phone:
STevenson 4-7210

WE HAVE IN STOCK
FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company

1347 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

SPRAY DRYING UNIT

We offer for immediate sale

One—Drying and Concentrating Company's spray drying unit complete with stainless steel drying chamber, air heating unit and filter, pumps, thermometers, preheaters, etc.

Open to inspection at any time at our plant at Peoria, Illinois.

ALLIED MILLS, INC.

P. O. Box 539 Peoria, Illinois

Tremendous Stock of Modern Rebuilt Machinery

UNION Rebuilt Machinery Established 1912

FILLERS & CAPPERS

Filler, Hope, Elgin S.S. Piston Fillers.
Elgin 24-Head Rotary Vacuum Filler.
Resina LC Automatic Capper.
Stokes & Smith G1, G2, G6 and HG88 Duplex Auger Fillers.
Triangle Package Models A3, G2C, G2S, A6CA Elec-Tri-Pak Fillers.
Horix 14-Head Rotary Filler.
Pfaudler King C9 Stainless Steel Rotary Gravity Filler.

MIXERS

Day, Robinson Dry Powder Mixers and Sifters, from 15 up to 10,000 lbs.
850 gal. Steel Vertical S. J. Mixer, M.D.
Day, New Era, Hottman Mixers 2 to 3500 gals. with and without Jackets, Single and Double Arm Agitators.
Mikro 3TH, 2TH, 1SH Pulverizers.
Rotex, Day, Robinson Sifters.

WRAPPERS

Very modern Pneumatic Scale Packaging Unit consisting of high speed Carton Feeder and Bottom Sealer, 2—Two Scale Weighers, high speed Top Sealer with Compression Drying Unit, Glue Tight Wrapper, Interconnecting Conveyors.
Stokes & Smith Model BB Transwraps.
Doughboy, Amsco Rotary Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hayssen, Package Machy. Co. FA, FA4, DF, CA2, Miller, Scandia and Oliver Automatic Cellophane Wrappers.
Hudson Sharp Campbell Auto. Cellophane Wrappers, Models 2W8 and 2W10.

LABELERS

Burt AUB Wraparound Labelers, 1 gal.
Pony M, ML, MX Labelrites.

MISCELLANEOUS

Brown PFM Auto. Bag Filling Machine.
Fitzpatrick "D" Stainless Steel Comminuter.
Charlotte 3 HP Monel Colloid Mill.
F. J. Stokes Models E and RBB Tablet Machines.
Colton 2 3RP, 5½ T Tablet Machines.

Available For Immediate Delivery At Bargain Prices
Act Now For Choice Selection

UNION STANDARD EQUIPMENT CO.
318-322 Lafayette Street New York 12, N. Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FORCED TO MOVE

Our property has been condemned with others to make way for a housing project. We are forced to move and will be in Newark, N. J., approximately Feb. 1, 1956 at an address to be announced.
Contact us now for real buys. It costs money to move and we do not wish to move anything.

SPECIAL OFFERING

Complete Crystallizing and Filtering unit installed 1951, used on Epsom Salts, capacity 1670 lbs. crystals per hr.
Swenson Continuous Rubber Lined Vac. Cooling Crystallizer.
Feinc 6' dia. Horiz. Filter S/S and Steel construction.
Shriver 30" plate & frame Filter Press.
2100 Gal. S/S Horiz. Tank; Pumps; Tanks; Kettles.

All units in very good condition.
We buy your surplus.

THE MACHINERY & EQUIPMENT CORP.
533 West Broadway, New York 12, N. Y.
GRamercy 5-6680
Harry Pearlman, Pres. Bill Wolf, Vice-Pres.

FOR SALE
30" Copper Coating Pans with stem coils
300 gal. Copper Still with condenser and tank
100 qt. 3 speed Read Master Mixer
80 qt. M-80 4-speed Hobart Mixer
100 gal. Copper Steam Jacketed Mixing Kettle
York Freon Compressor with 1½ HP 3 phase motor
Burns Split Nut Peanut Blancher
SAVAGE BROS. CO.
2838 Gladys Ave. Chicago 12, Ill.

SPECIAL OFFERINGS

MODERN PACKAGING EQUIPMENT

STANDARD-KNAPP Model 429 Case Sealer and Compression Unit.
PNEUMATIC SCALE COMPANY Cartoning Line, Consisting of: Automatic Feeder, Bottom Sealer, Filler, Top Sealer & Compression Unit.
PNEUMATIC SCALE COMPANY Tightwraps, High Speed.
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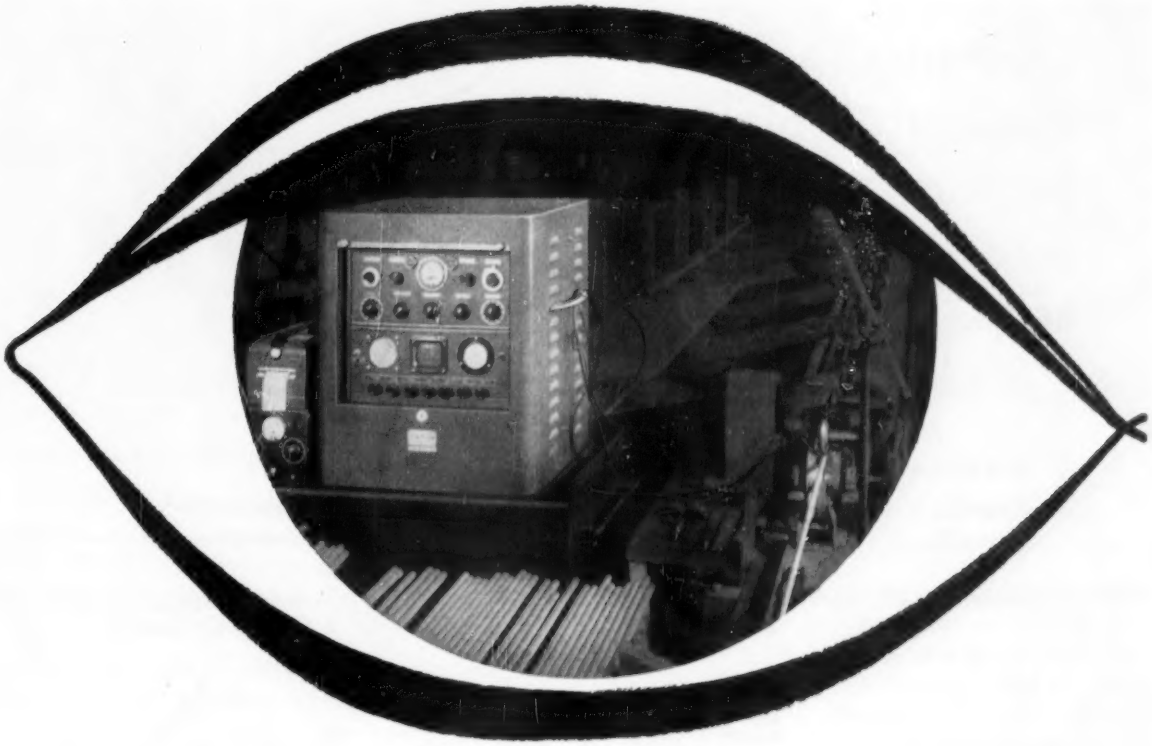

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WHY SHOULD THE VITAMIN C CONTENT OF FRUIT AND VEGETABLE JUICES BE STANDARDIZED?

Because nutrition reports disclose that—

- **Vitamin C deficiencies exist throughout the country***
- **Scurvy has not disappeared from the United States***

Proof of deficiencies among adults and children. You should know these facts!* Diet surveys from Maine and Vermont, New York, Illinois, New Mexico, Oregon, West Virginia, and Texas show a definite pattern of inadequate vitamin C intake. These studies covered grade school and high school children, college men and women.

Spongy, swollen gums symptomatic of scurvy.

From these studies* of dietary habits and physical conditions there is considerable proof that many of the children and adults covered by survey have actual, physical symptoms of vitamin C deficiency.

Infantile scurvy. Scurvy* occurs, even today, among infants who are artificially fed. Fortunately the disease may be cured by the administration of vitamin C. How much more sensible it is to prevent it by supplying these bottle-fed infants with the daily allowance of 30 milligrams of vitamin C as recommended by the Food and Nutrition Board of the National Research Council for children under one year of age.

Symptoms of infantile scurvy are fretfulness and fear of being touched.

These bottle-fed infants, unless receiving a pediatric prescription containing vitamin C, are largely dependent on supplemental ascorbic acid which they receive from fruit or vegetable juices. Unless fortified with vitamin C many of the processed juices may not supply these babies with adequate quantities of this essential element.

Typical position of legs in infantile scurvy.

What can be done? Because of the increasing evidence that American diets are deficient in vitamin C, leading nutrition experts believe that processed fruit and vegetable juices, on which the public is so reliant for its supply of this necessary vitamin, should contain the "Vital Ingredient."

The Vital Ingredient of any processed fruit or vegetable juice is a *dependable* and *adequate* supply of vitamin C. You can give your juice this ingredient by *standardizing its vitamin C content*. The processing is simple and the new low cost of ascorbic acid makes juice standardization more attractive than ever.

With ascorbic acid available *by the tons* at extremely modest cost fruit and vegetable juices can have a standardized vitamin C content for the better protection of the nation's health and well-being.

*Statements are based on documented reports. References on request.

Illustrations after photographs in The Vitamins in Medicine by Bicknell and Prescott, Third Edition, published by Grune & Stratton, Inc., New York.

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Circle page numbers at right. Suppliers will reply direct to you. No obligation. →

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22 All items shown
- 22a Bul. HAC-40
- 22b Bul. AA8
- 22c Bul. WB-10
- 22d Keller tools

47 All items shown
- 47a Tubing
- 47b Pumps
- 47c Valves

49 All items shown
- 49a Vitamins
- 49b Food colors
- 49c Vanillin
- 49d Sanitizing agents

59a Refrigeration equip.
59b Air-cond. equip.

115 All items shown
- 115a Bul. 30 FE
- 115b Motors
- 115c Hoists
- 115d Ventilating equip.

119 All items shown
- 119a Cat. B-102
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134a BW-7 Wrapper
134b BW-7 Slicer

136 All items shown
- 136a Zest
- 136b Syrups
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143a 1350 Mixer
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147 All items shown
- 147a Hose
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151a Trucks
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160 All items shown
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169 All items shown
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207 All items shown
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210a Booklet F-12
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211b No drip booklet
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4. TO CHANGE ADDRESS

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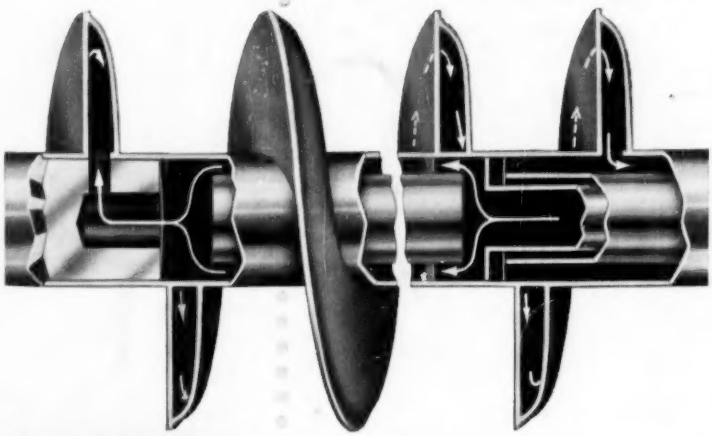

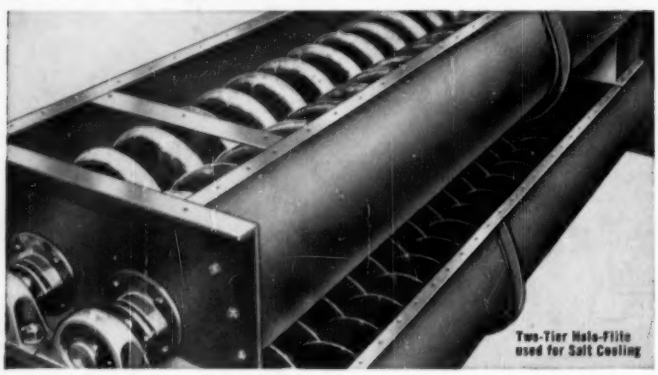

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FREE! New 8 Page Bulletin describing HOLO-FLITE features and applications will gladly be sent on request!

*Reg. T.M.

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